FILED
JAN 29 1969
JOHN F. DAVIS, CLERK

IN THE

Supreme Court of the United States

OCTOBER TERM, 1968.

No. 993

UNIVERSITY OF ILLINOIS FOUNDATION,
Petitioner,

vs.

WINEGARD COMPANY,
Respondent.

PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE EIGHTH CIRCUIT AND REQUEST FOR DELAYED CONSIDERATION.

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Petitioner prays that a writ of certiorari issue to review the judgment of the United States Court of Appeals for the Eighth Circuit entered in the above-entitled case on September 30, 1968, a rehearing of which was denied on November 5, 1968. Petitioner further prays that consideration of this petition be delayed pending the decision of the Court of Appeals for the Seventh Circuit in a closely related case (*University of Illinois Foundation* v. *Blonder-Tongue Laboratories* v. *JFD Electronics Corp.*, No. 17153), in which the validity of the same patent involved herein was upheld by the trial court.

OPINIONS BELOW.

The opinion of the district court (S. D. Iowa) is reported at 271 F. Supp. 412 (1967); a copy of this opinion is in the appendix attached hereto (App. 10A). The opinion of the Court of Appeals for the Eighth Circuit affirming the decision of the district court is reported at 402 F. 2d 125 (1968); a copy of this opinion is included in the appendix (App. 1A).

The unreported opinion of Judge Hoffman in the *Blonder-Tongue* case noted above is also included in the appendix (App. 24A).

JURISDICTION.

The judgment of the United States Court of Appeals for the Eighth Circuit was entered on September 30, 1968 and corrected on November 5, 1968. A timely petition for rehearing was denied on November 5, 1968 (App. 9A).

The jurisdiction of this Court is invoked under 28 U. S. C. § 1254 (1).

QUESTIONS PRESENTED.

1. Did the Court of Appeals for the Eighth Circuit narrow the proper standard of patentability in holding that an electronic improvement, consisting of a combination of known elements, is obvious because the combination could have been made by trial-and-error, where:

(a) The result produced by the combination is conceded to be unpredictable;

(b) The possible combinations of elements are numbered in the thousands; and

(c) There was nothing to show a reasonable probability of success which would lead one to try the numerous possible combinations, nor anything to lead him to the one valuable combination among thousands of worthless ones?

2. Is the standard of obviousness applied by the Court of Appeals for the Eighth Circuit to an electronic development contrary to the standard applied by this Court in *U. S.* v. *Adams*, 383 U. S. 39?

3. Should this Court resolve the conflict with respect to the validity of the patent in suit between the decision of the Court of Appeals for the Eighth Circuit and Judge Hoffman's later contrary decision in *University of Illinois Foundation* v. *Blonder-Tongue Laboratories, Inc.* v. *JFD Electronics Corp.*, in the Northern District of Illinois?

STATUTES INVOLVED.

Title 35 of the United States Code provides in pertinent part:

> Section 103. A patent may not be obtained though the invention is not identically disclosed or described as set forth in § 102 of this title, if the difference between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

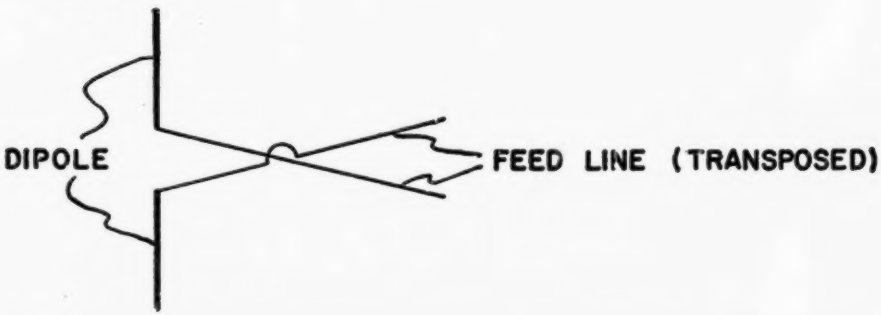
STATEMENT OF CASE.

Petitioner, University of Illinois Foundation (hereinafter "Foundation"), instituted this action against respondent Winegard Company in the United States District Court for the Southern District of Iowa, alleging infringement of Foundation's United States Letters Patent 3,210,767. Federal jurisdiction was based on the patent laws of the United States.

The Isbell patent in suit discloses and claims a novel type of antenna having the unusual and valuable property of being able to transmit or to receive, in a uniform manner

and without adjustment of the antenna, electromagnetic (i.e., radio and television) signals over a band of frequencies which is as wide as the designer of the antenna desires to make it. This property is valuable since it permits a single antenna to be used to send or receive signals which vary widely in frequency and thus avoids both the expense and the operating difficulties involved in having a number of separate and distinct antennas, each designed to receive a narrow band of frequencies when reception over a wide band is desired. The property is unusual because only a few such antennas existed, none of which used Isbell's elements, and it is only relatively recently that antennas capable of performance of this type have been developed. Even today (R. 107) the effective band width of a new antenna design cannot be predicted nor can a new type of antenna be designed to have frequency-independent performance with any assurance of success.

The antennas covered by the Isbell patent* belong to a class of antennas known as logarithmically periodic (log-periodic) arrays, composed of repeating design units called cells, which are generally of similar shape but varying size. In the Isbell antenna the design cell is a straight, narrow element called a dipole plus an adjacent section of transmission line with transposed conductors, as shown below:



* The details of construction are well described in the opinion of the district court (App. 12A-15A) and will not be repeated at length here.

With respect to the issues raised by this petition, the following points are pertinent:

1. The Court of Appeals found that there was no known "log periodic method of designing frequency independent antennas."

2. The Court of Appeals conceded that the result obtained from the combination of elements made by Isbell was unpredictable.

3. It is not controverted that the elements used by Isbell "are capable of an infinity of permutations." [See *B. G. Corp.* v. *Walter Kidde & Co.*, 79 F. 2d 20, 26 (2 Cir. 1935)].

4. There was no evidence that one skilled in the art would have considered Isbell's unpredictable result to be nevertheless obvious because of "a high degree of probability that a trial of it would be successful." [See *Application of Pantzer*, 341 F. 2d 121, 126 (C. C. P. A. 1965).]

In holding the Isbell patent invalid, the trial court said (App. 21A),

> "It is thus apparent that the Isbell antenna is a combination of elements, all known in the prior art and also that these known elements were combined in the Isbell antenna in a manner dictated by a theory also known in the prior art."

The theory referred to by the court as known was stated as "the log periodic method of designing frequency independent antennas." (App. 21A.)

On appeal, the Foundation argued that one of the court's findings was erroneous and that there was in fact no known "log periodic method of designing frequency independent antennas." The Court of Appeals agreed with the Foundation's argument, holding, "On the face of the record we

must agree that this finding is erroneous" (App. 3A). The Court further conceded that although a log periodic type of structure could readily be designed and built, it could not be predicted whether such a structure would have frequency independent characteristics.

In view of its finding that the "log periodic method of designing frequency independent antennas" was not in fact known to the art, the basis for the decision of the Court of Appeals is not apparent. No specific reason was given by the Court why one skilled in the art would have found it obvious to combine the elements of the antenna as Isbell did, other than the possibility that Isbell's combination might have been made by trial-and-error experimentation (App. 7A, 8A).

REASONS FOR GRANTING THE WRIT.

1. THE COURT OF APPEALS APPLIED A STANDARD OF PATENTABILITY CONTRARY TO THAT LAID DOWN BY THIS COURT.

In *Graham* v. *John Deere Co.*, 383 U. S. 1, this Court held that the statutory standard for patentability included the elements of novelty, utility and nonobviousness. With respect to an inquiry into nonobviousness,

> "the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined." (383 U. S. 17.)

In its decision, the Court of Appeals for the Eighth Circuit did not properly apply the standards set forth by this Court in the *Graham* case.

The evidence established and the Court agreed that one skilled in the art would have found it impossible to predict

that Isbell's antenna assembly would have frequency-independent performance. In view of this holding, the prima facie obviousness of combining the elements of Isbell's antenna in the manner used by Isbell disappears. The mere fact that all of the elements individually were old does not support a finding that the combination is therefore unpatentable, since as this Court said in *United States* v. *Adams,* 383 U. S. 39, 50:

> "It begs the question, and overlooks the holding of the Commissioner and the Court of Claims, to state merely that magnesium and cuprous chloride were individually known battery components. If such a combination is novel, the issue is whether bringing them together as taught by Adams was obvious in the light of the prior art."

Unpredictability of Result Cannot Be Ignored in Determining Nonobviousness.

The Court of Appeals dismissed the unpredictability of Isbell's invention as merely tending "to obscure the true issue of 'nonobviousness'." (App. 4A.) Granting that the statutory standard is "nonobviousness," petitioner nevertheless submits that predictability is a major factor to be considered in resolving the issue. As the C. C. P. A. said in *Application of Pantzer,* 341 F. 2d 121, 126 (1965):

> "In other words, an invention can be said to be obvious if one ordinarily skilled in the art would consider that it was logical to anticipate *with a high degree of probability* that a trial of it would be successful." (Emphasis added.)

In this case, not only was there no "high degree of probability" of success, exactly the opposite was true. One skilled in the art who might have contemplated making Isbell's combination would have anticipated failure with a high degree of probability.

Without the purported method for designing frequency independent log periodic antennas relied on by the trial court (which the Court of Appeals correctly found did *not* exist), there is no basis in the art for combining elements to make Isbell's combination. An antenna designer trying to design a frequency-independent antenna, at the time the invention of Isbell was made, would have been faced with the problem of selecting blindly or by trial and error, the single effective combination of elements made by Isbell from the vast number of such combinations which could be made and which would not work. Further, the log-periodic theory is by no means the only approach to antenna design regardless of whether the objective is frequency independence. There were many other basic approaches from which the designer had to make a selection. In *Frank W. Egan & Co.* v. *Modern Plastic Machinery Corp.*, 387 F. 2d 319, 323 (2nd Cir. 1967) the Court held:

> "As Judge Learned Hand phrased it in *B. G. Corp.* v. *Walter Kidde & Co.*, 79 F. 2d 20 (2 Cir. 1935): 'All machines are made up of the same elements * * * *But the elements are capable of an infinity of permutations,* and the selection of that group which proves serviceable to a given need may require a high degree of originality. *It is that act of selection which is the invention*' . . ." (Emphasis added.)

The "obvious-to-try" test which was applied in effect by the Court of Appeals is not sufficiently discriminatory. This approach to the results of research is unrealistic and contrary to statute (35 U. S. C. 103), which provides that "Patentability shall not be negatived by the manner in which the invention is made.", and has been criticized by the courts. In *Application of Tomlinson,* 363 F. 2d 928, 931 (1966), the C. C. P. A. rejected the argument that the invention involved only "routine experimentation", saying:

> "Our reply to this view is simply that it begs the question, which is obviousness under section 103 of

> *compositions* and *methods*, not of the direction to be taken in making *efforts* or *attempts*. Slight reflection suggests, we think, that there is usually an element of 'obviousness to try' in any research endeavor, that it is not undertaken with complete blindness but rather with some semblance of a chance of success, and that patentability determinations based on that as the test would not only be contrary to statute but result in a marked deterioration of the entire patent system as an incentive to invest in those efforts and attempts which go by the name of 'research'." (Emphasis in original.)

In the present case, there was no indication that Isbell's combination of elements had a higher degree of probability of success than any other of the countless combinations which could have been made. Further, not only does the record show that others at the University of Illinois tried and failed to achieve the Isbell type of antenna (R. 103, 104), it also shows that there was a serious need for such an antenna which others had failed to satisfy (R. 123-125). The fact that this need existed and that others had not even pursued the idea of a log-periodic dipole array, is additional evidence that such a pursuit was not obvious.

This is not a situation where the obviousness of combining the elements would have been apparent on its face to one skilled in this field. The combination of elements made by Isbell involved an interdependent functional relationship which was apparently ignored by the Court of Appeals in coming to its decision.* This interdependent functional relationship is illustrated by the testimony of

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* In its original version (App. 7A) the decision of the Court of Appeals contained the statement:

> "Nor is it claimed that the subject patent 'embrace(s) elements having an interdependent functional relationship.' *United States* v. *Adams*, 383 U. S. at 50."

After petitioner pointed out in its motion for a rehearing that such a claim had been made several times in its briefs, the Court amended its decision by cancelling the sentence quoted above.

Winegard's president, which the Court of Appeals quoted in footnote 5 of its decision (App. 7A):

> ". . . if you are just concerned with one dipole, one straight dipole, it would be very easy to determine the actual length by calculation, but when you place several elements together there is always an interaction which will affect the length . . ."

One Skilled in the Art Would Have Been Deterred From Making Isbell's Combination.

In its decision, the Court of Appeals distinguished the decision of this Court in *United States* v. *Adams,* 383 U. S. 39 (1966), on the ground that there was no deterrent which faced those in the art who sought to achieve Isbell's result. It is respectfully submitted that the Court of Appeals erred.

Rather than having a reasonable prospect for success in designing a log-periodic antenna, one skilled in the art would have expected failure and thus would have been deterred from even making the attempt. The knowledge that only a few successful log-periodic structures were found among the many that had been designed and tested is, in effect, a teaching away from such structures for one seeking to design a frequency independent antenna. What is obvious to one skilled in the art depends, of course, on the knowledge possessed by those skilled in the art at the time the invention is made. This knowledge would hardly suggest that a log-periodic structure employing simple dipoles would obviously function in a frequency independent manner.

2. THE DECISION OF THE COURT OF APPEALS OF THE EIGHTH CIRCUIT IS IN CONFLICT WITH A DECISION OF THE DISTRICT COURT OF THE NORTHERN DISTRICT OF ILLINOIS ON THE SAME PATENT.

As was briefly indicated in the introductory portion of this petition, the Isbell patent was held valid in an action tried in the Seventh Circuit (*University of Illinois Foundation* v. *Blonder-Tongue Laboratories, Inc.* v. *JFD Electronics Corp.*, N. D. Ill., Civil Action Number 66C567) after the trial in the Eighth Circuit. Judge Julius J. Hoffman, before whom the *Blonder-Tongue* case was tried, was supplied with the record on appeal and the appeal briefs of counsel in the *Winegard* case, which had not yet been decided by the Eighth Circuit Court of Appeals. In his decision, Judge Hoffman referred to the *Winegard* litigation involving the Isbell patent and held (App. 26A):

> "On the basis of the evidence before it, this court disagrees with the conclusion reached in the *Winegard* case and finds both the Isbell patent and the Mayes et al. patent valid and enforceable patents."

Judge Hoffman's decision of validity for the Isbell patent has been appealed to the Court of Appeals for the Seventh Circuit.

The Isbell patent in question is an important basic patent in the field of television receiving antennas for home use. At the present time there are pending three different patent infringement actions in the Seventh Circuit involving the Isbell patent. In addition, there are several instances of probable infringement in circuits other than the Seventh or Eighth in which the validity of the Isbell patent may be litigated. It is therefore important to the television antenna industry that a final adjudication of the validity of the Isbell patent be made.

3. THE STANDARD OF PATENTABILITY APPLIED BY THE EIGHTH CIRCUIT COURT OF APPEALS EFFECTIVELY DENIES THE PATENTABILITY OF ALL COMBINATIONS OF OLD ELEMENTS, REGARDLESS OF THE EFFECTS ACHIEVED.

The decision of the Court of Appeals holds, in effect, that Isbell's combination of old elements is obvious, in spite of the fact that the results achieved thereby were unpredictable and the art did not suggest this particular combination, on the ground that "The problem here was one of trial and error with a combination of commonly used elements operating within known principles of electronics and mechanics to achieve a desired result." Since a desired result can readily be postulated without knowing how to obtain the result and since a trial-and-error procedure is always possible, the Court's decision effectively denies the patentability of all combinations of known elements. The Court's rationale could just as readily be applied to deny the patentability of a novel chemical compound having the unpredictable property of curing cancer, on the ground that, since the chemical elements are known, the result can be achieved in an obvious way merely by trial and error experimentation with all possible combinations of these chemical elements.

The standard of obviousness cannot be as broad as that adopted by the Court of Appeals. As noted on p. 8 of this petition, the "obvious to try" approach was recently criticized by the C. C. P. A. (*Application of Tomlinson,* 363 F. 2d 928, 931 (1966)) in rejecting the argument that an invention involved only "routine experimentation."

If the Court's "obvious to try" criterion is accepted as the proper standard of obviousness, the result would be the marked deterioration or indeed the destruction of our

entire patent system, as the C. C. P. A. noted in the *Tomlinson* case quoted above (page 9). If the mere fact that known elements are intentionally combined renders a combination unpatentable, even though the result is unpredictable and the combination is made without a reasonable prospect for success, then only accidental discoveries will be patentable, because there are few, if any, new elements which can be combined.

CONCLUSION.

It is respectfully submitted that for the reasons stated and under the authorities cited, the petition for a writ of certiorari herein sought should be granted.

Respectfully submitted,

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APPENDIX.

I. OPINION OF COURT OF APPEALS AFFIRMING DISTRICT COURT.

UNIVERSITY OF ILLINOIS FOUNDATION,
Appellant,

vs.

WINEGARD COMPANY,
Appellee.

No. 19000.

UNITED STATES COURT OF APPEALS,
Eighth Circuit.

Sept. 30, 1968.

Rehearing Denied Nov. 5, 1968.

Before MATTHES, MEHAFFY and LAY, *Circuit Judges.*

LAY, *Circuit Judge.*

The plaintiff, the University of Illinois Foundation, appeals from a judgment below denying patent validity to its United States Letters Patent No. 3,210,767,[1] relating to a "frequency independent unidirectional antenna." The plaintiff is the owner by assignment from one Dwight E. Isbell. For facility of discussion we refer to the patent

1. Plaintiff's assignor filed his application for patent on May 3, 1960.

itself as the "Isbell Patent." Suit was brought against the defendant Winegard Company for alleged infringement. Trial was held before the Honorable Roy L. Stephenson, Chief Judge of the Southern District of Iowa. Judge Stephenson held that the subject matter of the patent did not rise to the level of patentability and dismissed plaintiff's suit. See *University of Illinois Foundation* v. *Winegard Co.*, 271 F. Supp. 412 (S. D. Iowa 1967).

The Isbell Patent claims a high quality television antenna for color reception, with unidirectional performance over a wide bandwidth of frequencies. The trial court denied validity to the patent in that "it would have been obvious to one ordinarily skilled in the art and wishing to design a frequency independent unidirectional antenna to combine * * * prior art references * * *." Id. at 419.

There is no necessity to set forth the full discussion of the facts relating to the prior art. These appear in the excellent analysis made by the Chief Judge below. We have examined the record and find that all claims must be denied, lacking nonobviousness as a matter of law for essentially the same reasons set forth by the court below.

Plaintiff urges that the trial court erred in denying patent validity and calls our attention to a subsequent decision in a federal district court in Illinois which upholds the validity of the same patent against another defendant, *University of Illinois Foundation* v. *Blonder-Tongue Laboratories, Inc.*, N. D. Ill., Civ. No. 66 C 567. However, as recognized by the district court in Illinois, we must determine this case on its own record.[2]

The plaintiff basically urges on appeal that the district

2. Compare this court's holding in *Imperial Stone Cutters, Inc.* v. *Schwartz*, 370 F. 2d 425 (8 Cir. 1966), invalidating the letters patent previously upheld in 1958 by another panel of our court on a different record in *Ezee Stone Cutter Mfg. Co.* v. *Southwest Indus. Prods., Inc.*, 262 F. 2d 183 (8 Cir. 1958).

court in the present case erred in finding that "those skilled in the art at the time of the Isbell application knew * * * the log periodic method of designing frequency independent antennas." On the face of the record we must agree that this finding is erroneous. The record discloses that the log-periodic formula[3] for antenna design was a recognized theory within the calling. This formula is discussed in the authoritative article by Drs. Hamel and Ore entitled Logarithmically Periodic Antenna Designs, published in March of 1958. However, as pointed out by plaintiff, this same article discloses:

> "Unfortunately, no theory has been estabiished which even predicts the types of structures which will give frequency independent operation."

Jasik's Antenna Engineering Handbook, a recognized authority in the field, verifies on page 18: "* * * it is not possible to determine *a priori* the frequency independent type of log-periodic antennas." The record is clear that both plaintiff and defendant experts agreed with this fact.

Thus, we feel the evidence only discloses the adaptation by plaintiff of the log-periodic formula to obtain geometric proportional spacing across its bandwidth. It did not teach

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3. As summarized by the trial court:

> "Generally stated, log periodic antennas are designed according to the theory that an antenna 'design cell' having high performance characteristics for reception of a limited band or period of radio frequency signals, if altered in all dimensions by a constant scale factor will have high performance characteristics for reception of a band of signals having wavelengths which vary from the wavelengths of the first band of frequencies by the same constant scale factor. Thus, according to the theory, if an antenna design cell has certain characteristics for reception of particular frequency wavelengths, an antenna geometrically similar but reduced in all dimensions by a scale factor of .5 will have similar characteristics for reception of frequencies of wave lengths half those of the first." *University of Illinois Foundation* v. *Winegard Co.*, 271 F. Supp. 412, 417 (S. D. Iowa 1967).

that said spacing will in itself achieve frequency independent operation. As we view the record it is the achievement of frequency independent operation through the use of the dipole array which is the principal claim of the Isbell Patent. Both parties' experts agree that with frequency independent operation "severe end-effects" and unstable performance is avoided. A frequency independent antenna is one in which the basic electrical characteristics remain substantially constant over a given frequency range. These characteristics generally relate to uniform gain, bandwidth, directivity and a good impedence match. Unless an antenna achieves frequency independent operation it will not offer the high quality performance over a wide band of frequencies needed for commercial operation.

However, we do not view the acknowledged fact of the unpredictability of the frequency independent operation of the Isbell Patent as requiring us to reach a result different than held below. Nor was the trial court's finding in this regard essential to its overall reasoning that the patent itself was made obvious by the prior art. The statutory standard of patentability under § 103 is not "predictability." This terminology helps to obscure the true issue of "nonobviousness." The valid test relates the subject patent to whether its development would be obvious to one skilled in the art. As stated by Mr. Justice Clark, the test of nonobviousness "is one of inquiry, not quality * * *." *Graham* v. *John Deere Co.*, 383 U. S. 1, 17, 86 S. Ct. 684, 15 L. Ed. 2d 545 (1966). As we have often repeated such inquiry relates to: (1) scope and content of the prior art, (2) differences between the subject patent and the prior art, (3) the level of the skill in the art at the time involved and (4) secondary considerations relating to commercial success, long-felt need, et al. And of course, the latter factors cannot alone determine patentability. *National Connector Corp.* v. *Malco Mfg. Co.*, 392 F. 2d 766 (8 Cir. 1968).

Therefore, we deem the sole legal issue in the instant case to be whether a person skilled in the calling could improve with the skill of the calling the prior art by obvious means.

The mere fact that the "invention" was not previously known or developed is not the test. Where logical exploration within known principles of the science achieves an unpredictable result, even though a commercially desirable one, the burden of nonobviousness is not necessarily overcome. In other words, the necessity of logical experimentation does not in and of itself negate obviousness.[4] Cf. *General Mills, Inc.* v. *Pillsbury Co.*, 378 F. 2d 666 (8 Cir. 1967).

As early asserted by Mr. Justice Bradley in *Atlantic Works* v. *Brady*, 107 U. S. 192, 199-200, 2 S. Ct. 225, 231, 27 L. Ed. 438 (1882):

> "The process of development in manufactures creates a constant demand for new appliances, which the skill of ordinary head-workmen and engineers is generally adequate to devise, and which, indeed, are the natural and proper outgrowth of such development.

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4. In *Minnesota Mining & Mfg. Co.* v. *Coe*, 69 App. D. C. 217, 99 F. 2d 986, 989 (1938), the court said:

> "But a showing of great industry in experimental research is not in itself sufficient to constitute invention, when the product thereof differs from those of the prior art only in degree and the result—no matter how useful it may be—is merely one step forward in a gradual process of experimentation."

In *Busell Trimmer Co.* v. *Stevens*, 137 U. S. 423, 435, 11 S. Ct. 150, 154, 34 L. Ed. 719 (1890), the United States Supreme Court said:

> "But the patent before us is no such case. The most that can be said of it is that it shows, on the part of Orcutt, great industry in acquiring a thorough knowledge of what others had done in the attempt to trim shoe soles in a rapid and improved mode, by the various devices perfected by patents for that purpose, good judgment in selecting and combining the best of them, with no little mechanical skill in their application; but it presents no discoverable trace of the exercise of original thought."

> Each step forward prepares the way for the next, and each is usually taken by spontaneous trials and attempts in a hundred different places. To grant to a single party a monopoly of every slight advance made, except where the exercise of invention, somewhat above ordinary mechanical or engineering skill, is distinctly shown, is unjust in principle and injurious in its consequences."

Plaintiff urges Isbell had to overcome two serious handicaps which hid the developmental obviousness: (1) the use of linear dipoles to achieve a broad-band result, and (2) the mismatch of impedance. The simple answer to this argument is that the "problems" presented were never recognized beyond experimental correction by those skilled in the calling. Although linear dipoles may have been used with "narrow-band" antennas, such configuration had been shown to be used with antennas having broad-band characteristics. Defendant's tests demonstrated they had substantially the same characteristics (except impedance) as the "folded dipole." They had been utilized interchangeably by experimental engineers. These equivalent characteristics were known long before the Isbell Patent.

The problem of matching impedance was one of adjustment. However, matching impedance is an elementary problem to those skilled in radio electronics. Impedance is recognized as the resistance to the flow of current. It is fundamental that efficient performance of any antenna occurs only through a maximum power transfer of the transmission line to the antenna itself. This requires matching impedance as much as possible. No claim of "invention" is asserted to overcome the mismatch, only that the antenna itself was, therefore, not obvious. The ability to match impedance with the linear dipole array was not new to the development and exploration which led to the Isbell antenna. There was not involved the same deterrent as experienced in *United States* v. *Adams*, 383 U. S. 39, 86

S. Ct. 708, 15 L. Ed. 2d 572 (1966), where chemicals were interchanged, admittedly non equivalents, to achieve the "water battery."* The problem here was one of trial and error with a combination of commonly used elements operating within known principles of electronics and mechanics to achieve a desired result. Cf. *Marconi Wireless Tel. Co. of America* v. *United States,* 320 U. S. 1, 63 S. Ct. 1393, 87 L. Ed. 1731 (1942).

In Jasik's Antenna Engineering Handbook it is stated on page 1813:

> "Since log-periodic antennas are too complex to analyze by present-day theoretical methods, they must be investigated by *logical experimental methods.*[5] However their repetitive nature greatly simplifies the initial experimental investigation because the characteristics need only be measured over one or two periods of frequency." (Emphasis ours.)

Plaintiff claims that the frequency independent operation of the Isbell antenna was accomplished by "specified

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* The original slip decision of Court contained at this point the sentence:

> "Nor is it claimed that the subject patent 'embrace(s) elements having an interdependent functional relationship.' *United States* v. *Adams,* 383 U. S. at 50."

This sentence was deleted by order of the Court on Nov. 5, 1968.

5. Mr. Winegard of the defendant company relates the experimental engineers' approach:

> "Well, in the early days I used to calculate the resonance. There's so many factors with respect to the length of the element—if you are just concerned with one dipole, one striaght dipole, it would be very easy to determine the actual length by calculation, but when you place several elements together there is always on inter-action which will affect the length, so in order to get optimum performance from an array it is necessary to tune the antenna by slightly modifying the actual length of the—I have been working with antennas so long it is like learning the English language, you don't have to look at the dictionary every time to figure out how to spell 'and.' You know what I mean?"

scaling factors to determine dipole length, design cell dimensions, and spacing between dipoles." Here again, the evidence reflects that plaintiff did nothing more than logical and mechanical experimentation within suggested principles and design from the existing art. As the trial court found, there exists a direct relationship between the length and cell dimension of the Isbell claims and those of the prior art found within the K. O. antenna. And plaintiff's own expert discounted the significance of the dipole spacing as a design factor.

Problems of impedance, patterns, resonance, gain, directivity and bandwidth, may all vary upon experimentation within recognized principles of elements having known interrelated electrical characteristics. And naturally, only high quality performance will be the optimum design array desirable. Such experimental combination of common elements and principles, e.g., dipole array, transposed feed, end fed and log-periodic formula, by selected spacing to obtain an improvement of both antenna design and performance, does not obviate the test of nonobviousness. If this were not true, at least in the instant case, nonobviousness would depend simply upon achieving a new result. The standard of patentability under § 103 requires more.

Judgment affirmed.

II. ORDER OF COURT OF APPEALS DENYING PETITION FOR REHEARING.

UNITED STATES COURT OF APPEALS,

For the Eighth Circuit.

No. 19000.

UNIVERSITY OF ILLINOIS FOUNDATION,

Appellant,

vs.

WINEGARD COMPANY.

Appeal from the United States District Court for the Southern District of Iowa.

There is before the Court appellant's petition for rehearing en banc and on consideration of such petition, it is the order of the Court that the petition for rehearing en banc be, and it is hereby denied.

November 5, 1958.

III. DECISION OF IOWA DISTRICT COURT.

UNIVERSITY OF ILLINOIS FOUNDATION, *Plaintiff*,

vs.

WINEGARD COMPANY, *Defendant*.

Civ. No. 3-695-D.

UNITED STATES DISTRICT COURT,
S. D. Iowa,
Davenport Division.

June 23, 1967.

As Amended July 18, 1967.

MEMORANDUM OPINION.

STEPHENSON, *Chief Judge*.

This action was brought by the plaintiff University of Illinois Foundation, the owner by assignment of U. S. Patent 3,210,767, issued to Dwight E. Isbell on October 5, 1965 (hereinafter referred to as the Isbell Patent and attached hereto as Appendix A), against the defendant Winegard Company wherein the plaintiff seeks a finding that said patent has been and is being infringed by the defendant. In its answer the defendant alleges, *inter alia*, invalidity of the patent on the grounds that the invention was disclosed more than one year prior to the date of the application for the patent and that, at the time made, the invention was obvious to one skilled in the art. Jurisdiction is established by virtue of 35 U. S. C. § 281 and 28 U. S. C. § 1338.

Inasmuch as the defendant alleges invalidity of the patent as a defense, the Court must determine initially whether or not the Isbell patent is valid. *General Mills* v. *Pillsbury Co.*, 378 F. 2d 666 (8th Cir., 1967); *American Infra-Red Radiant Co.* v. *Lambert Indus., Inc.*, 360 F. 2d 977, 983-984 (8th Cir., 1966). Of course, a patent from the fact of its issuance is presumed to be valid. 35 U. S. C. § 282; *Radio Corporation of America* v. *Radio Engineering Laboratories, Inc.*, 293 U. S. 1, 7-8, 55 S. Ct. 928, 79 L. Ed. 163 (1934); *L & A Products, Inc.* v. *Britt Tech. Corp.*, 365 F. 2d 83, 86 (8th Cir., 1966); *American Infra-Red Radiant Co.* v. *Lambert Indus., Inc., supra,* 360 F. 2d at 988-989. However, this presumption of validity is weakened when, as in this case, there are prior art references or alleged disclosures of the patent before the Court that were not considered by the patent office during the prosecution of the application for the patent. *Imperial Stone Cutters, Inc.* v. *Schwartz,* 370 F. 2d 425, 429 (8th Cir., 1966); *American Infra-Red Radiant Co.* v. *Lambert Indus., Inc., supra,* 360 F. 2d at 989; *Greening Nursery Co.* v. *J & R Tool & Mfg. Co.*, 252 F. Supp. 117, 139 (S. D. Iowa, 1966), aff'd, 376 F. 2d 738 (8th Cir., 1967).

There are three separate conditions precedent to patent validity. They are: Novelty, utility, and nonobviousness. 35 U. S. C. §§ 101-103; *Graham* v. *John Deere Co.*, 383 U. S. 1, 12, 86 S. Ct. 684, 15 L. Ed. 2d 545 (1966); *United States* v. *Adams,* 383 U. S. 39, 48, 86 S. Ct. 708, 15 L. Ed. 2d 572 (1966); *L & A Products, Inc.* v. *Britt Tech. Corp., supra,* 365 F. 2d at 85. In this case the defendant relies on lack of novelty (Title 35 U. S. C. Section 102) and obviousness (Section 103) as barring patentability. It is the opinion of the Court that the issue of obviousness is dispositive of this case. Therefore, that issue will be first considered.

While the ultimate question of patent validity is one of law, the determination of the question of obviousness lends

itself to several basic factual inquiries. *Graham* v. *John Deere Co., supra,* 383 U. S. at 17, 86 S. Ct. 684; *L & A Products, Inc.* v. *Britt Tech. Corp., supra,* 365 F. 2d at 86. In addition to setting out the scope of the patent in suit, the scope and content of the prior art must be defined so that a determination can be made as to whether the differences between the patent in suit and the pertinent prior art would have been obvious to one ordinarily skilled in the art. If such differences as may exist would have been obvious to a person ordinarily skilled in the art, the obviousness test of 35 U. S. C. § 103 has not been met and the patent will be invalid. *Graham* v. *John Deere Co., supra,* 383 U. S. at 37, 86 S. Ct. 684; *General Mills, Inc.* v. *Pillsbury Co., supra.*

THE PATENT IN SUIT.

The Isbell Patent is entitled "Frequency Independent Unidirectional Antennas" and relates to antennas designed for the transmission and reception of electomagnetic radio frequency signals. These signals are used for the broadcasting of many types of communications including radio and television signals. The Isbell antenna consists of a plurality of elements called "dipoles"[1] which are ar-

1. Generally, in this context, a simple straight dipole antenna element consists of two elongated metallic conductors (wires, rods or tubes) arranged approximately colinearly in such a manner that there is a small gap or terminal between their inner ends, at which point a transmission line is attached. The familiar "rabbit-ear" indoor television antenna is a simple dipole having its arms at an angle rather than in a straight line. When immersed in an electromagnetic field the dipole element will intercept electromagnetic radio waves and produce a voltage across the terminal. This voltage is carried to the receiver by means of the transmission line. The dipole antenna element, like any other electrical conductor, will intercept radio energy from the atmosphere to a limited extent, regardless of the frequency of the energy being transmitted. There is, however, a special condition, known as "resonance", in which the dipole is strongly receptive, which occurs when the dipole is of a particular length in relationship to the wavelength of the radiated

ranged in relation to each other and connected to each other in a particular manner. Generally, as stated in the patent specification, "the antennas of the invention are coplanar dipole arrays consisting of a number of dipoles arranged in side-by-side relationship in a plane, the length and the spacing between successive dipoles varying according to a definite mathematical formula, each of the dipoles being fed by a common feeder (transmission line) * * *."[2] According to the patent specification,

> The lengths of the dipoles and the spacing between dipoles are related by a constant scale factor τ defined by the following equations:
>
> $$\tau = \frac{L_{(n+1)}}{L_n} = \frac{\triangle S_{(n+1)}}{\triangle S_n}$$
>
> where τ is a constant having a value less than 1, Ln is the length of any intermediate dipole in the array, L(n+1) is the length of the adjacent smaller dipole, $\triangle$Sn is the spacing between the dipole having the length Ln and the adjacent larger dipole, and $\triangle$S(n+1) is the spacing between the dipole having the length Ln and the adjacent smaller dipole.[3]

The feeder or transmission line consists of two conductors, one of which is connnected to the inner end of one-half of each dipole, the other being connected to the inner end of the other half of the dipole, and transposed between

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energy. This condition occurs primarily when the overall length of the dipole is one-half of the wavelength of the radio wave. Thus, it is apparent that a dipole can be "tuned" for optimum reception of a particular radiowave frequency by adjusting the overall length of the dipole. The relative ability of one antenna to produce a signal (i.e., a radio frequency voltage) at a given location distant from the transmitting station in comparison with another antenna similarly located is a measure of the antenna's "gain," a technical term used in the industry in reference to an antenna's signal-producing capabilities.

2. Isbell Patent, Col. 1, lines 14-19. See App. A.

3. Isbell Patent, Col. 1, lines 50-62. See App. A.

connections of successive dipoles in such a manner that each conductor is connected alternately to the left and right halves of successive dipoles. (See Appendix A, Fig. 1.)

Antennas designed in accordance with the patent specifications are claimed to have unidirectional radiation patterns and high quality performance which are, over a wide band of frequencies, essentially independent of the frequency of the electromagnetic radio waves being transmitted or received. An antenna with such characteristics is, of course, desirable when the reception of many different frequencies is required as one such antenna may be used in place of many antennas which are each capable of receiving a limited number of frequencies. Since VHF television signals are broadcast over a range of frequencies of 54 megacycles/second to 216 megacycles/second,[4] an antenna capable of receiving high quality signals with uniform performance characteristics in that range of frequencies would be of commercial utility. This is particularly true in respect to the reception of color television signals where the minimum standards of performance are higher than those required for satisfactory black and white television reception.

There are fifteen claims in the Isbell patent. See Appendix A. All of the claims except numbers 6, 7 and 8 are claimed to be infringed by one or more of twenty-two models of defendant's antennas which are designed for the

4. Channels 2-6 broadcast over radiowave frequencies 54-88 megacycles/second, each channel being assigned a band 6 megacycles wide in which to broadcast. Thus, channel 2 broadcasts over the range 54-59 megacycles/second; channel 3, 60-65 megacycles/second; etc. Channels 7-13 broadcast over frequencies 176-216 megacycles/second, with 89-175 megacycles/second being assigned to non-television broadcasting. While some of the antennas accused of infringing are designed for the reception of VHF and UHF (470-890 megacycles/second) signals, it is only the VHF sections of these antennas that are alleged to be infringements of the Isbell patent.

reception of television signals.[5] Specifically, all twenty-two models are alleged to be literal infringements of claims 14 and 15 and also within the inventive concept of claims 1-5 and 9-13. In addition, one of the antennas, the chromatel CT-100, is alleged to be a literal infringement of claims 1, 2, 9, 10, 11, and 12. It should be noted here that while the portions of the antennas which are charged as infringing are designed solely for the reception of VHF television signals, the Isbell antenna is not so limited. It is designed both as a receiving antenna and a transmitting antenna for use in an unlimited range of frequencies. For example, the specification indicates that the antenna has very high performance characteristics over as high a range as 1100 to 1800 mc/sec.[6]

Prior Art.

Four prior patents are cited in the patent as having been considered by the patent examiners. One of these patents, five other U. S. patents not referred to by the examiners, an article published on March 31, 1958 and three antennas *in use prior to 1959* are among the references relied upon by the defendant as revealing the prior art at the time of the invention. An examination of some of these references will be helpful in defining the state of the prior art

5. The Winegard antennas that are alleged to be infringements of the Isbell patent are the models with the following numbers:

Chromaflex B-445	R.C.A. 10-B- 200
Chromaflex B-550	R.C.A. 10-B- 300
Chromaflex B-555	R.C.A. 10-B- 400
Chromaflex B-660	R.C.A. 10-B-1010
Chromaflex B-770	R.C.A. 10-B-1020
Chromaflex B-105	R.C.A. 10-B-1030
Chromaflex B-335	R.C.A. 10-B-1040
Chromatel CT- 40	R.C.A. 10-B-1050
Chromatel CT- 80	R.C.A. 10-B-1120
Chromatel CT- 90	R.C.A. 10-B-1130
Chromatel CT-100	R.C.A. 10-B-1140

6, Isbell Patent, Col. 2, lines 47-52. See App. A.

on May 3, 1960, the date of the filing of the application for the patent.

The Katzin patent (U. S. Patent No. 2,192,532, the first page of which is attached hereto as Appendix B) cited by the patent office reveals an antenna consisting of an array of dipole elements of different lengths arranged in a side-by-side relationship in a plane. While some of the illustrated embodiments of the Katzin invention show antennas having several elements of one length arranged parallel to several elements of another length, one illustrated embodiment (Figure 3c, Appendix B) shows an array described in claim 7 of the patent as being "a plurality of aerial elements, all of differing length, continuously tapering in length from one end of said antenna to the other * * *."[7] The patent also suggests in claim 11 thereof, that the spacing between the shorter elements may be less than that between the longer elements.[8] The teaching of the Katzin patent is that if elements, or groups of elements, of differing lengths are combined into one array, each of the elements, or groups of elements, "will respond most efficiently to its corresponding band of frequencies, so that the combination of two or more such groups * * * will give the result of a high response for a wider frequency band."[9]

One of the antennas cited as prior art by the defendant is the Channel Master "K. O." antenna model 1023, produced and marketed by the Channel Master Corporation at Ellenville, N. Y. between September 1954 and December 1958. A schematic diagram of this antenna, Exhibit DX-G-16, is attached hereto as Appendix C. This antenna is

7. U. S. Patent No. 2,192,532, p. 2, Col. 2, lines 54-58.

8. U. S. Patent No. 2,192,532, p. 3, Col. 2, lines 5-14; See also Fig. 3d, App. B.

9. U. S. Patent No. 2,192,532, p. 2, Col. 1, lines 16-21.

an array of *folded* dipoles,[10] each of a different length, arranged in a coplanar side-by-side relationship decreasing in length from one end of the array to the other. The spacing between the dipole elements is irregular, the elements not being equally spaced and the spacing not varying progressively from one end of the array to the other. The feeder or transmission line running between the elements consists of two conductors, one of which is connected to one end of the folded dipole at the terminal point, the other connected to the other end of the dipole at the terminal point, and transposed between dipoles such that each conductor is alternately connected to the left and right ends of successive dipoles. Transposed feeder lines are also shown in the Koomans Patent (U. S. Patent No. 1,964,189, the first page of which is attached hereto as Appendix D) and the Winegard Patent (U. S. Patent No. 2,700,105, the first page of which is attached hereto as Appendix E), both of which are cited as prior art by the defendant. The White Patent (U. S. Patent No. 2,105,569, the first page of which is attached hereto as Appendix F) also uses transposed feeder lines in conjunction with dipole elements decreasing in length from one end of the array to the other. However,

10. Folded dipoles are simple dipoles, see n. 1, *supra*, which have been altered by adding another conductor in such a manner that it is approximately parallel to the simple dipole and attached to the outer ends of each half of the simple dipole. The resulting structure is an elongated loop having a terminal point midway along one of its longer sides. (See App. C.) Folded dipoles have somewhat different characteristics than straight or simple dipoles, the primary differences being that folded dipoles have better performance over a greater band-width of frequencies and that folded dipoles have a greater resistance to the flow of electric current than do simple dipoles. This resistance to the flow of current is known as "impedence." In order to achieve the maximum transmission of the signal to the receiver, the impedence of the antenna, the transmission line and the receiver should be as nearly equal as possible. Television transmission line and receivers have an impedence set by FCC regulation at about 300 ohms. A simple dipole has an impedence of about 75 ohms while a folded dipole has an impedence of about 300 ohms.

the White array is "center-fed," that is, connected to the down lead transmission line which leads to the receiver, at the center of the array, rather than at the end of the array. The antennas described in the Katzin, Koomans, and Winegard patents noted above and the "K. O." antenna, as well as the Isbell antenna, are all fed at the end of the antenna having the smaller elements.

The article cited by the defendant Winegard as prior art is "Logarithmically Periodic Antenna Designs" published by R. H. DuHamel and F. R. Ore on March 31, 1958. This article explains the elements of the theory of logarithmically periodic (log periodic) antennas and the development of several such antennas. Generally stated, log periodic antennas are designed according to the theory that an antenna "design cell"[11] having high performance characteristics for reception of a limited band or period of radio frequency signals, if altered in all dimensions by a constant scale factor will have high performance characteristics for reception of a band of signals having wavelengths which vary from the wavelengths of the first band of frequencies by the same constant scale factor. Thus, according to the theory, if an antenna design cell has certain characteristics for reception of particular frequency wavelengths, an antenna geometricaly similar but reduced in all dimensions by a scale factor of .5 will have similar characteristics for reception of frequencies of wavelengths half those of the first. The theory continues that if a particular design cell is reduced successively by a constant scale factor which is less than 1, and repeated periodically in one antenna "array", the array will have the characteristics of the

11. The term "design cell" is used herein to refer to a structural unit of an antenna which is capable of receiving and transmitting electromagnetic radio energy. A simple or folded dipole and an adjacent section of transmission line are examples of such antenna design cells. A particular antenna array may be composed of one or more similar or dissimilar design cells.

design cell over a broader band of frequencies which is limited only by the largest and smallest of the geometrically similar design cells which are repeated in the array. Because the performance of the antennas so designed is theoretically the same over any band of frequencies for which the antenna is designed the antennas are termed Frequency Independent Antennas. The application of this theory to antenna design appears to be limited only by the conditions that the design cell used must have uniform performance over a single period and that the overall array, the periodic repetition of the cell, not cause an "end effect"[12] that would destroy the frequency independence of the array.

The formula set out by DuHamel and Ore as defining the relationship between the repeated, or periodic, design cells is:

$$\tau = \frac{R_{(n+1)}}{R_n},$$

which defines a constant proportional relationship between like elements of the design. In this case the formula relates to the radii of circular structures. Of course, in the case of geometrically similar designs all dimensions of one design are proportionally equal to all dimensions of the other similar designs. That is, they must all vary proportionally.

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12. Very generally stated, "end effect" is a term used to describe a bouncing back and forth, from one end of an antenna array to the other, of any energy that is not fully transmitted or absorbed by the elements of the antenna as the energy travels initially along the antenna. This bouncing, or reflection, back and forth may cause shadows or ghosts in the reception of a television picture. Thus, in order to avoid this end effect an antenna should be designed to have sufficient elements to radiate or absorb all of the energy as it passes from one end of the antenna to the other so that there will be no such reflection of the energy back down the antenna.

The theory of the log periodic antenna was adopted by Isbell in his work and the formula,

$$\tau = \frac{L_{(n+1)}}{L_n} = \frac{\triangle S_{(n+1)}}{\triangle S_n}$$

where τ is a constant having a value of less than 1, can be seen to be a simple adaptation of the DuHamel-Ore formula[13] and its mathematical equivalent.

The Invalidity of the Patent.

Keeping in mind the prior art previously discussed, it can be seen that an antenna with the general parameters of the Isbell Patent will result from a combination of the dipole array of Katzin with the transposed feeder line of the Channel Master "K. O." or the Koomans or Winegard Patents. Such an antenna would consist of a coplanar side-by-side array of straight dipole elements of differing lengths which decrease in length and spacing from one end of the array to the other (as disclosed by claims 7 and 11 of the Katzin patent), fed at the small end of the array by

13. While DuHamel and Ore defined circular structures by relating the radii of different parts of one cell to the radii of another, Isbell has defined linear structures by relating the lenghts and spacings of one design cell to another. That these are alternative means of expressing the same mathematical relationship is evident from an examination of Figure 1 of the Isbell patent and the discussion, found in Col. 1, line 63 to Col. 2, line 2 of the patent relative to the distance from the base line O, in Figure 1, to the dipole having the length Ln. If the distance from the base line O to dipole having the length Ln were the radius of a circle having its axis at line O and its circumference tangent to the same dipole, the distance represented by Xn ("the distance from the base line O to the dipole having the length Ln", see Col. 1, lines 71-72 of Appendix A) would be equal to Rn, where Rn is the radius of the said circle having its axis at O and its circumference tangent to the dipole of length Ln; then, it is easily seen that the formulas $\tau = \frac{R_{(n+1)}}{R_n}$ (Isbell) and $\tau = \frac{X_{(n+1)}}{X_n}$ (DuHamel & Ore) are different but equal mathematical expressions of the same proportional relationship.

a two conductor transmission line that is transposed between successive elements (as disclosed by the Koomans and Winegard Patents and the Channel Master "K. O." antenna). Further, if the length and spacing of the dipole elements in such an antenna are adjusted by the log periodic theory of antenna design which dictates that the periodic or repeating cells (here a dipole element and adjoining section of transmission line) shall be geometrically similar and related to each other in size by a constant scale factor, the result is the Isbell antenna disclosure. It is thus apparent that the Isbell antenna is a combination of elements, all known in the prior art and also that these known elements were combined in the Isbell antenna in a manner dictated by a theory also known in the prior art. Therefore, the critical question is whether such a combination would have been obvious to one reasonably skilled in the art of antenna design. *United States* v. *Adams, supra,* 383 U. S. at 50-52, 86 S. Ct. 708, 15 L. Ed. 2d 572; *Kell-Dot Indus., Inc.* v. *Graves,* 361 F. 2d 25, 30 (8th Cir., 1966); *American Infra-Red Radiant Co.* v. *Lambert Indus., Inc., supra,* 360 F. 2d at 988. Those skilled in the art at the time of the Isbell application knew (1) the log periodic method of designing frequency independent antennas, (2) that antenna arrays consisting of straight dipoles with progressively varied lengths and spacings exhibit greater broad band characteristics than those consisting of dipoles of equal length and spacing and, (3) that a dipole array type antenna having elements spaced less than ½ wavelength apart could be made unidirectional in radiation pattern by transposing the feeder line between elements and feeding the array at the end of the smallest element.

It is the opinion of the Court that it would have been obvious to one ordinarily skilled in the art and wishing to design a frequency independent unidirectional antenna to combine these three old elements, all suggested by the prior

art references previously discussed.[14] The test of obviousness is the proper test to be applied in determining whether a new combination of known elements is patentable. *American Infra-Red Radiant Co.* v. *Lambert Indus., Inc., supra,* 360 F. 2d at 988. When one skilled in the art with the prior art references before him could have, without the exercise of inventive faculty, combined old elements known in the art to produce the plaintiff's "invention," the "invention" does not rise to the level of patentability notwithstanding the fact that it may be an improvement over the prior art. *Kell-Dot Indus., Inc.* v. *Graves, supra,* 361 F. 2d at 29. The Court, upon full consideration of the

14. It should also be noted that the File Wrapper of the Isbell patent indicates that on November 9, 1960, all original 9 claims (final claims 1-8 and another never approved) were initially rejected by examiner G. N. Westby as being met by Katzin (Patent No. 2,192,532, App. C) in view of other patents teaching the crossing of the feeder line and the use of straight tubular conductors. On May 10, 1961, Isbell submitted an amendment to the Patent Office wherein he argued that

> "there is certainly no teaching or suggestion in the Katzin patent of an arrangement in which *both* the length of successive dipoles *and* the spacing between said dipoles vary in a manner *such that the ratio of the length of adjacent dipoles is a constant which is also equal to the ratio of the spacings between adjacent dipoles.* Unless both of these conditions are met the antenna does not have the remarkably wide band paths, the high gain and the directivity exhibited by the antennas of the invention." (Emphasis in the original.)

Subsequently, original claims 1-8 were allowed by examiners H. K. Saalbach and Eli Lieberman as were 7 additional claims added as a result of an interference proceeding and further amendments by the applicant. It appears, thus, that the above argument in regard to the constant proportional relationship of the lengths and spacings of the elements and the importance of such relationship convinced the Patent Office that the Isbell disclosure was patentable. However, there is nothing in the file wrapper to indicate that, in ruling on the patentability of the Isbell patent, the patent examiners considered the published work of DuHamel and Ore, the formula set out therein, or the log periodic theory of antenna design all of which was a part of the prior art at the time of the application. Reference was made thereto in the interference proceedings as indicated in PX-68.

record herein, finds that the disclosure of Isbell Patent No. 3,210,767 is lacking in the prerequisite nonobviousness and is, therefore, invalid.

Inasmuch as an invalid patent cannot be infringed, *Imperial Stone Cutters, Inc.* v. *Schwartz, supra,* 370 F. 2d at 429; *Kell-Dot Indus., Inc.* v. *Graves, supra,* 361 F. 2d at 23, the question of infringement is rendered moot and is, therefore, not decided by this Court.

The foregoing shall constitute the findings of fact and conclusions of law pursuant to Fed. R. Civ. P. 52(a).

It is ordered that judgment will be entered, for the defendant with costs, exclusive of attorney's fees, taxed to the plaintiff.

(The Appendix to the District Court's Opinion is omitted. It may be found in the Record at pages 29-38.)

IV. OPINION OF JUDGE HOFFMAN IN RELATED CASE AFFIRMING VALIDITY OF ISBELL PATENT.

UNITED STATES DISTRICT COURT,

Northern District of Illinois,

Eastern Division.

Name of Presiding Judge, Honorable Julius J. Hoffman.

Cause No. 66 C 567. Date September 11, 1967.

UNIVERSITY OF ILLINOIS FOUNDATION *vs.* BLONDER-TONGUE LABORATORIES, INC. *vs.* JFD ELECTRONICS CORPORATION.

MEMORANDUM OF DECISION.

Julius J. Hoffman, District Judge. The plaintiff and counterclaim defendant, The University of Illinois Foundation (hereinafter "the Foundation"), brings this suit, charging the infringement of two patents, against the defendant and counterclaimant, Blonder-Tongue Laboratories, Inc. (hereinafter "Blonder-Tongue"). The plaintiff is a not-for-profit corporation established under the laws of the State of Illinois and having its place of business in Champaign, Illinois. One of the Foundation's functions is to hold and administer patents covering inventions developed at the University of Illinois. Blonder-Tongue, a New Jersey corporation with its principal place of business in Newark, New Jersey, is engaged in the manufacture and sale of equipment, including antennas, for the distri-

bution and reception of television signals. The plaintiff alleges that Blonder-Tongue has infringed two patents held by the plaintiff by manufacturing and selling television antennas embodying the inventions of thes patents.

Blonder-Tongue has denied the validity of the patents in suit and has asserted that, even if they were valid, they have not been infringed by Blonder-Tongue. Blonder-Tongue has also denied their enforceability. In addition, Blonder-Tongue has brought a counterclaim against the Foundation and JFD Electronics Corporation (hereinafter "JFD"), a New York corporation in the business of manufacturing and selling, among other products, antennas for use with home television receivers. The counterclaim charges that the Foundation and JFD have been guilty of unfair competition, antitrust violations, and infringement of one claim of a patent held by Blonder-Tongue.

This court has jurisdiction of the cause under 28 U. S. C. § 1338. Blonder-Tongue, which does not have "a regular and established place of business" in this District, was joined as a defendant with one of its Chicago distributors, Allied Radio Corporation, but waived its defense of improper venue and allowed Allied Radio Corporation to be dismissed.

Blonder-Tongue's Motion to Dismiss.

Blonder-Tongue's motion to dismiss the complaint for failure to prove a prima facie case, which this court stated during trial it would decide after the close of all the evidence, is denied.

THE FOUNDATION'S PATENTS.

The plaintiff's patents in suit are Patent No. 3,210,767, entitled "Frequency Independent Unidirectional Antennas," which issued to the plaintiff on October 5, 1965, as the assignee of Dwight E. Isbell (hereinafter referred to as the Isbell patent), and Reissue Patent No. 25,740, entitled "Log Periodic Backward Wave Antenna Array," which issued to the plaintiff on March 9, 1965, as the assignee of Paul E. Mayes and Robert L. Carrel (hereinafter referred to as the Mayes et al. patent).

The Isbell patent has been previously litigated in the United States District Court for the Southern District of Iowa in *University of Illinois Foundation* v. *Winegard Company*, 271 F. Supp. 412 (S. D. Iowa 1967). The Isbell patent was there held invalid solely on the issue of obviousness. This court is, of course, free to decide the case at bar on the basis of the evidence before it. *Triplett* v. *Lowell*, 297 U. S. 638, 642 (1936). Although a patent has been adjudged invalid in another patent infringement action against other defendants, patent owners cannot be deprived "of the right to show, if they can, that, as against defendants who have not previously been in court, the patent is valid and infringed." *Aghnides* v. *Holden*, 227 F. 2d 949, 951 (7th Cir. 1955). On the basis of the evidence before it, this court disagrees with the conclusion reached in the *Winegard* case and finds both the Isbell patent and the Mayes et al. patent valid and enforceable patents. It further finds that the two patents have been infringed by Blonder-Tongue.

Description of the Patents.

The plaintiff's patents in suit relate to antennas having unidirectional radiation patterns essentially independent of frequency over a wide band of frequencies. The antennas covered by the patents are equally suitable for both the reception and the transmission of radiated electromagnetic energy (which includes radio and television frequency signals), but our primary concern is with their use for television reception. The characteristics desired in an antenna used for the reception of television signals are a function of the nature of frequency transmission. Although the frequency of a transmitted wave remains essentially constant as the wave moves through space, the strength of the signal decreases with increasing distance. An antenna is used to isolate the desired signal from interfering signals which exist at the point of reception and to make this signal available to the television receiver, via a transmission line, in as large a magnitude as possible.

The characteristics of an antenna which measure its performance are its gain, its bandwidth, its directivity, and its impedance. "Gain" is the measure of its ability to increase the strength of an incoming signal relative to a fixed standard; high gain is a desired characteristic. "Bandwidth" is its capacity to receive, without adjustment, signals of different frequencies with essentially constant gain. An antenna whose reception is essentially independent of frequency over a wide band of frequencies is known as a "wide-band" or "frequency independent" antenna. "Directivity" is an antenna's ability to receive signals from one desired direction as compared to all other directions. Television antennas are preferably unidirectional in order to eliminate interference with the desired signal and the "ghost" images such interference produces. "Impedance" is a measure of an antenna's ability to transfer

energy to the transmission line. An antenna's impedance should match as closely as possible the impedance of the transmission line to prevent the formation of "ghosts." In the design of antennas, one desired characteristic is often obtained at the expense of another. The antenna designer's goal, of course, is to achieve the best possible balance of the several different characteristics.

The simplest antenna which has been put to practical use for television reception is the dipole antenna, which consists of a pair of linear components extending from each side of a transmission line fed in the center at the inner ends of the linear components. Shortly after 1954, the log-periodic principle of antenna design was developed. The structures designed in accordance with this principle have cyclic performance characteristics which repeat periodically as frequency is increased. Although some log-periodic structures have broadband characteristics, most do not. While a log-periodic structure can readily be designed by one using the log-periodic design principle, it cannot be predicted whether such a structure will have broadband characteristics and thus operate successfully as a log-periodic antenna.

The invention covered by the Isbell patent was made by Dwight E. Isbell during the course of his work at the University of Illinois Antenna Laboratory under an Air Force contract. Isbell's invention is a log-periodic antenna which contains a number of dipole elements arranged in a substantially planar, parallel arrangement to form an antenna array. The lengths of dipoles vary from one end of the antenna to the other in accordance with a scale factor, a constant less than one, which is used to establish the length of adjacent elements. The spacing between adjacent elements also varies, preferably in the same manner. The dipoles are fed from the end of the antenna

having the shortest dipoles by a twin-line feeder which provides a phase reversal of 180 degrees between adjacent dipoles by alternately connecting successive dipole halves. The Isbell antenna provides unidirectional radiation patterns of essentially constant beam width and input impedance for any desired band width.

The invention covered by the Mayes et al. patent was made by Paul E. Mayes and Robert L. Carrel during the course of their work at the University of Illinois under the same Air Force contract. Their antenna incorporates the structural characteristics of the Isbell antenna, with one modification: the dipoles in the array are inclined or V'd. The apex formed by the V's points in the same direction as the signal received by the antenna. The dipole element size increases in the same direction. While the Isbell antenna's dipoles provide a broadband unidirectional antenna with an upper frequency limit established by the length of the shortest dipole in the antenna, the Mayes et al. V-shaped elements permit the antenna to be operated over much higher bands of frequency and with increased directivity, thus increasing the effective frequency range of the antenna and constituting an improvement over the Isbell invention.

Validity of the Patents.

Patentability is dependent upon three conditions explicitly set out in the federal statutes governing patents: novelty and utility, as defined in 35 U. S. C. § 101 and § 102, are non-obviousness, as set out in § 103. *Graham* v. *John Deere Co.*, 383 U. S. 1, 17 (1966). The defendant has charged that the Isbell patent is invalid because it is obvious, is anticipated by two earlier inventions, and was disclosed in a printed publication more than one year prior to the filing of the Isbell application. Blonder-Tongue also charges that the Mayes et al. patent is invalid because

it is obvious, was not conceived by its purported inventors but by another, and was secured originally by a fraud upon the Patent Office.

A. *The Isbell Patent.*

The § 103 condition, non-obviousness, "lends itself to several basic factual inquiries." As the Supreme Court has stated, under § 103,

> the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or nonobviousness, these inquiries may have relevancy.

Graham v. *John Deere Co.*, 383 U. S. 1, 17-18 (1966).

The primary inquiry, therefore, is the scope and content of the prior art, the differences between that prior art and the claims at issue, and the level of ordinary skill in the field. Blonder-Tongue asserts that Isbell's invention is obvious in view of the prior art, specifically (1) the K. O. antenna, the Channel Master antenna K. O. model 1023; (2) the Katzin patent, No. 2,192,532; and (3) an article by DuHamel and Ore, entitled "Logarithmically Periodic Antenna Designs," published on March 31, 1958. The court disagrees.

The K. O. antenna, sold commercially by Channel Master Corporation in or about 1955, was an antenna which employed folded dipoles. Such folded dipoles differ significantly from the straight or simple dipoles used by

Isbell. Further, there was no pattern in the K. O. antenna's dipole spacing, which first increases, then decreases, then increases again from the back to the front of the antenna. The use of narrow band, simple dipoles in a log-periodic array to achieve a broadband effect was in no way suggested by the K. O. antenna.

The Katzin patents covers an array of dipole elements of differing size and different lengths, arranged in a side-by-side relationship in a plane, continuously tapering in length from one end of the antenna to the other, with smaller spacing between shorter elements than between longer ones. The patent does not exhibit log-periodic design and for this and other reasons does not suggest the Isbell antenna.

The DuHamel and Ore article, in its own language, "reports research on new types of broadband logarithmically periodic antenna structures." The characteristics of such structures were known in 1958 and the structures themselves are described. But the paper, by its own statement, proves that "no theory has been established which even predicts the types of structures which will give frequency independent operation. * * * Thus, it is felt that a theoretical investigation of this class of antennas would be fruitful." It cannot be said that this article taught a method for designing log-periodic antennas which would predictably operate with frequency independence, and the Isbell patent was not obvious after its publication.

Much evidence in the record establishes that the design of successful log-periodic antennas was recognized by the art itself to be unpredictable. In brief, the design of such antennas at the time of the Isbell invention (and indeed even now) was a challenge to the inventor. Isbell's success was unpredicted and, the court finds non-obvious to other persons skilled in the art. In order to defeat a meritorious

patent it is not enough "to pick out isolated features" in the prior art, "combine them in one particular way with hindsight acquired only from the patent under attack, and then say that no invention would have been involved in selecting those particular features and combining them in the particular way in which the patentee did." *Eversharp, Inc.* v. *Fisher Pen Co., Inc.*, 204 F. Supp. 649, 662-63 (N. D. Ill. 1961).

As for the "secondary considerations" of obviousness or nonobviousness, such as "commercial success, long felt but unsolved needs, failure of others, etc.," this court's conclusion is bolstered still more. Dr. DuHamel, among others, attempted to construct an antenna with the characteristics exhibited by Isbell's and failed. When apprised of it, DuHamel was surprised to learn that such a structure worked. There can scarcely be more convincing proof that Isbell's invention met a "long felt but unsolved need" in the antenna industry.

Apart from raising the question of obviousness, Blonder-Tongue challenges the validity of the Isbell patent on other grounds. First, it claims that the invention was not novel because it was anticipated by the K. O. antenna and the DuHamel et al. patent, No. 3,079,602. For the reasons described above, in the court's discussion of the lack of obviousness, even in view of the K. O. antenna, the court concludes that Isbell's invention was similarly not anticipated by the K. O. antenna. The DuHamel et al. patent, filed March 14, 1958 and patented February 26, 1963, also does not anticipate the Isbell patent. It teaches a logarithmically periodic rod antenna, which is significantly different from a log-periodic antenna consisting of a dipole array, different enough so that DuHamel himself was astonished to learn of the success of the Isbell invention.

Blonder-Tongue also charges that the Isbell antenna was disclosed in a printed publication more than one year prior to the filing of Isbell's application. This question is that last remaining challenge to the Isbell patent. The plaintiff has conceded that the Quarterly Engineering Report No. 2, the publication at issue, "would have anticipated Isbell's invention if it had been published at a sufficiently early date," but argues that there is no competent evidence that the report was in fact published earlier than May 5, 1959. The question here is whether the invention was "described in a printed publication . . . more than one year prior to the date of the application for patent," which would negate patentability under 35 U. S. C. § 102. The application for the Isbell patent was filed on May 3, 1960. Hence it becomes crucial to know the date of "publication" of the quarterly report, which the plaintiff concedes describes the invention sufficiently to come within the meaning of the statute. The plaintiff acknowledges that the report was printed and was physically available prior to May 3, 1959, but denies that it was "published" earlier than May 5, 1959, on which date the report was mailed to those persons on the distribution list.

The evidence which tends to support the defendant's position on the question of publication is the testimony of Miss Marjorie Johnson in the *Winegard* trial, of record in this case by stipulation. Miss Johnson, whose formal position with the University of Illinois in 1959 was Technical Editor of the Electrical Engineering Research Department, was responsible for distributing Electrical Engineering Laboratory publications, such as the quarterly reports. As part of her duties, Miss Johnson also kept copies of such publications in a "library" of sorts, where, because there were no supervisory personnel, materials were kept in locked cabinets and were generally obtained by request from a member of the publications staff having

a key. Miss Johnson testified that the quarterly report involved here was in the publications office on April 30, 1959, and was therefore "available for distribution upon request on that date," although they were not actually distributed to persons on the distribution list until May 5, 1959. If Miss Johnson were truly a librarian and the document had been available in a genuine library, even a very small or a highly specialized library, this court would be compelled by the weight of authority to hold that such availability constituted "publication" within the meaning of § 102. See, e.g., *Hamilton Laboratories, Inc.* v. *Massengill*, 111 F. 2d 584 (6th Cir. 1940). However, the court finds the nature of the availability of the document in this case was not sufficiently "public" in nature to constitute the kind of publication intended by the act, at least until the report was distributed on May 5, 1959. In my view, the document had merely arrived from the printer and had come into the possession of the publications office on April 30, 1959, and although there existed the rather remote possibility that a person knowing of the report might have asked for it and obtained a copy of it on that date, this kind of availability did not represent "publication."

B. *The Mayes et al. Patent.*

The defendant claims that the Mayes et al. patent is obvious in view of Isbell's prior work and the Carter patent, No. 1,974,387. The Mayes et al. patent represents an improvement over the Isbell patent in that its dipoles are inclined or V'd, permitting the antenna to be operated over much higher bands of frequency and with increased directivity, increasing the effective frequency range. The dipole elements are bent forward at an angle between 50 and 150 degrees, rather than being attached perpendicularly, as in the Isbell patent. The Carter patent teaches an antenna "comprising a pair of angularly disposed

linear conductors," but it can hardly be said to teach the considerably more sophisticated Mayes et al. invention. It must be noted here, as observed heretofore with respect to the Isbell invention, that predictions in the field of electronics and particularly in the field of antenna design are undependable. There was no obvious basis for one skilled in the art to take the isolated features shown in the two earlier patents and to combine them as Mayes and Carrel did. Their invention was, the court concludes not obvious.

The two final challenges to the Mayes et al. patent are (1) that it was not conceived by Mayes and Carrel but by another, and (2) that it was secured by a fraud upon the Patent Office. The first contention is based upon Dr. Maye's "admission" on cross-examination that the V-construction which constitutes the only structural difference between his patent and the Isbell patent "was suggested to him by Mr. Turner of Wright Air Development Center." But, a mere suggestion by another is not enough to constitute anticipation sufficient to negate novelty. "The mere mental conception of the desirability of doing something and of the means of doing it will not amount to anticipation. An invention is not anticipated by mere surmises or theories or by inferences as distinguished from disclosures." 1 Deller's *Walker on Patents* (2d ed.) § 68. Turner's suggestion in this instance was not an "invention" and did not anticipate the Mayes and Carrel invention. The second contention is, in brief, that the plaintiff's procuring of the Mayes and Carrel patent was "effected by an entirely misleading affidavit, either prepared willfully or through gross and wanton neglect, perpetrating a fraud on the Patent Office." The defendant makes the further argument that none of the conditions required by law for the granting of a reissue patent obtained in this case. The evidence supports neither of

these charges. First, the evidence does not show that Mayes et al. misrepresented any fact to the Patent Office during the prosecution of the patent. Second, Mayes et al. were under no obligation to disclose their knowledge of references, other than those which disclose the identical invention. *Wen Products, Inc.* v. *Portable Electric Tools, Inc.*, 367 F. 2d 764, 767 (7th Cir. 1966).

In conclusion, the court finds both the Isbell and the Mayes et al. patents valid and enforceable patents.

Infringement of the Patents.

The log-periodic antennas sold by the defendant which are asserted to infringe the plaintiff's patents are antennas of two series. The first are the Golden series, consisting of the Golden Dart and Golden Arrow television antennas, the former the outdoor, the latter the indoor models. These are UHF antennas, designed to receive television signals transmitted by channels 14 through 83, and are charged with infringing all of the claims of the Isbell patent. It was stipulated by the parties that if the representative antenna, Plaintiff's Exhibit #10, was found to infringe, the other member of the series also infringed. The second series is the Color Ranger series, consisting of the Color Ranger-3, Color Ranger-5, Color Ranger-7, Color Ranger-10, and Color Ranger-15. These are VHF antennas, designed to receive signals transmitted by stations 2 through 13, and are asserted to infringe claims 1 through 5 of the Isbell patent and all of the claims of the Mayes et al. patent. The representative antenna is Plaintiffff's Exhibit #35. It was stipulated by the parties that if it was found to infringe, all other members of the series also infringed.

The court finds that the Isbell patent is basic to both series of Blonder-Tongue's antennas. All of its claims are

infringed by the Golden series, while claims 1 through 5 are infringed by the Color Ranger series. The Color Ranger also infringes all of the claims of the Mayes et al. patent. The court finds that the length of the dipoles and the spacings between adjacent dipoles in the accused Blonder-Tongue antennas follow the log-periodic arrangement disclosed and claimed in the patents in suit. Each of the antennas contains three or more parallel dipoles which vary progressively in length and spacing in accordance with a substantially constant scale factor. The scale factor for length is literally constant, in the Golden series, and the average variation from a constant scale factor for spacing is plus or minus 6%. In the Color Ranger series, the scale factor is literally constant for both length and spacing. The separation in the planar arrangement is one-eighteenth wavelength or less for both series. Although the broader the bandwidth desired, the closer an antenna must conform to the preferred construction of the Isbell antenna, where broadband requirements are not excessively great (and this is true for many practical applications), satisfactory operation can be obtained with an Isbell antenna whose dipole elements are not arranged in a strictly planar arrangement but are separated by a small fraction of a wavelength. The Blonder-Tongue antennas' dipole elements are separated by not more than one-eighteenth wavelength, making them substantially coplanar. In addition, each of the dipoles is connected by a two-conductor feeder, the conductors of which have the effect of alternately connecting the opposite dipole element of successive dipoles.

BLONDER-TONGUE'S COUNTERCLAIM.

The counterclaim filed by Blonder-Tongue against the Foundation and JFD contains three counts. The first two counts charge unfair competition and violations of the antitrust laws; the third charges infringement of Blonder-Tongue's own patent, No. 3,259,904, issued July 5, 1966, to Isaac S. Blonder and Abraham Schenfeld.

UNFAIR COMPETITION AND ANTITRUST VIOLATIONS.

Blonder-Tongue's first claim of unfair competition and antitrust violations by the counterclaim defendants is its charge against the advertising campaign utilized by JFD, as licensee under the Foundation's patents, to sell the antennas it produced pursuant to the licensing agreement. Blonder-Tongue describes some of the language employed in JFD advertisements as unfair, but the Court finds that it was within the range of acceptable sales efforts and was not so offensive as to be characterized as "unfair." For example, JFD's use of the phrase, "developed by the antenna research laboratories of the University of Illinois," in connection with its product does not violate this court's notions of what is fair competition in a highly competitive world. The fair import of this phrase is that the JFD antennas were initially developed by persons at the University, and the factual basis for such a statement is not disputed. The advertisements invariably added that the antennas were adapted for home television used by JFD; this statement is also correct. The advertising effort represented by these statements and others like them cannot be deemed "unfair." See *Drop Dead Co., Inc.* v. *S. C. Johnson & Son., Inc.*, 326 F. 2d 87, 96 (9th Cir. 1963), *cert. denied*, 377 U. S. 907 (1964).

Likewise, the alleged "mismarking" of antennas and advertisements with representations of patent coverage for

the JFD antennas which Blonder-Tongue asserts was misleading was not shown by the evidence to be either deliberate or of damaging effect. Its effect, if any, was minimal. There was no convincing evidence to support the conclusion that potential purchasers were influenced by such markings to buy or not to buy either JFD's or its competitors' antennas, or that such markings were deliberately intended to gain an unfair advantage over JFD's competition. *S. W. Farber, Inc.* v. *Texas Instruments, Inc.*, 230 F. Supp. 883, 892 (D. Del. 1964), *aff'd*, 344 F. 2d 957 (3d Cir. 1955), *cert. denied*, 382 U. S. 843 (1965).

Nor was the use of the phrase "the patented log-periodic cellular formula" unfair. JFD maintains that it referred to the antenna itself, a log-periodic antenna using the patented cellular concept. This is a reasonable construction of the phrase; the reader was not necessarily led to believe that JFD had patented the whole concept of log-periodicity. The court's conclusion is that JFD's advertising was not improper. The defendant is entitled neither to an injunction to halt allegedly unfair advertising practices nor to damages resulting from a loss of business allegedly attributable to such practices, since the evidence supports neither claim.

Blonder-Tongue further contends that the counter-claim defendants, particularly the Foundation undertook an unfair campaign to police its patents by numerous lawsuits and threats of litigation. It is conceded by Blonder-Tongue, as it must be, that there is nothing improper in bringing lawsuits against those believed in good faith to be infringers. But Blonder-Tongue's complaint is that suits were brought "to coerce the trade into dealing with JFD exclusively," that news releases concerning this litigation were "deliberately widely circulated in the trade," and that such practices "far transcend the proper use of patents and patent litigation." A review of the evidence

demonstrates clearly that such allegations are wholly without basis in fact. The patentee, in the belief that its patents were valid and infringed (as they have indeed been shown to be), had the right to protect its claims by notifying the trade of alleged infringements. Its activities here were not unreasonable. *Al-Fab Aluminum-Fabricators, Inc.* v. *Wagner,* 220 F. Supp. 715 (N. D. Ill. 1963). The argument that it was improper to sue Blonder-Tongue in this District is irrelevant to the claim of unfair practices made here. Blonder-Tongue might have brought timely objection to the venue but chose not to do so, and this court has not, in any case, been shown how the choice of venue has worked to Blonder-Tongue's competitive disadvantage. Even if suit had been brought in Blonder-Tongue's home state of New Jersey, news releases describing the litigation might have been distributed anywhere, including this District. From the standpoint of competition, therefore, it is immaterial that Blonder-Tongue was sued here rather than in any other District.

The claim that the Mayes et al. patent was procured improperly from the Patent Office has been discussed *supra* as part of the court's discussion of the patent's validity. There was no evidence that its procurement constituted unfair competition, as charged by Blonder-Tongue.

Blonder-Tongue makes the further claim that JFD "raided" key personnel from Blonder-Tongue, and that this constituted an unfair competitive practice. The record shows that several persons formerly in Blonder-Tongue's employ were subsequently hired by JFD and that, after the departure of one of these, some records dealing with customers were found to be missing. If the court were free to speculate on the significance of this evidence, it might be tempted to conclude, with Blonder-Tongue, that that company had been (in popular parlance) "raided" by JFD. But more than mere speculation is required to justify such

a conclusion. There must be proof, and such proof is lacking here. Those employees later hired by JFD made up a small fraction of the total number of employees who left Blonder-Tongue during the same period of time, and a number of reasons, such as dissatisfaction with Blonder-Tongue, genuinely arrived at, appear from the evidence to have been instrumental in causing the employees to change their positions. The record contains no evidence that JFD "raided" Blonder-Tongue. *Dempster Bros., Inc.* v. *Perfection Steel Body Co.*, 182 F. Supp. 307, 309 (N. D. Ohio 1959).

Blonder-Tongue has also argued that JFD attempted to force its customers to purchase its unpatented products as a "tie-in" with its patented products. Proof of such a practice would constitute, of course, an antitrust violation as well as an unfair competitive practice. *Carbice Corp. of America* v. *American Patents Development Corp.*, 283 U. S. 27 (1931). The only evidence, however, which tends to support this argument is the testimony of a JFD official who admitted that JFD salesmen would try to persuade their customers to handle not only JFD antennas but its other products as well. This is a normal business practice: all salesmen try to sell their entire line of merchandise rather than merely their most popular products. There was no probative evidence here of any coercion or threats made to customers to force their purchase of the entire JFD line. Only proof of such a compulsory tie-in would permit the court to find either an unfair competitive practice or a violation of the antitrust laws, and such proof is absent in the record.

The court concludes that JFD was not guilty of any wrongful practices with regard to the marketing and sales of their antennas. The role of the Foundation in the activities characterized by Blonder-Tongue as unfair and in violation of the antitrust laws is, on this view of the evi-

dence, immaterial. Whether the Foundation was a "mere licensor" or something more than that is of no importance since the accused practices are not found to be beyond the reasonable bounds of competition.

INFRINGEMENT OF BLONDER-TONGUE'S PATENT.

The third count of Blonder-Tongue's counterclaim charges that Claim 5 of the patent held by Blonder-Tongue, the Blonder et al. patent No. 3,259,904, has been infringed by the counterclaim defendants. The antenna of Claim 5 comprises a pair of parallel conductors (twin booms) spaced apart vertically in a vertical plane. Dipole elements lying in vertically-spaced horizontal planes extend from the conductors at successive points along the lengths of the conductors, with dipole lengths increasing gradually from one end of the conductors to the other, the shortest dipoles at the front end of the conductors, where terminals connect a parallel wire transmission line to the antenna. Rigid insulating means, maintaining the terminals spaced apart, are connected with a strain relief or standoff for supporting the transmission line near the front end. Further rigid insulating means maintain the conductors' spacing at a region remote from the front end. The vertical distance between conductors is less than the distance between successive dipole elements and less than the wavelengths of the frequency band of the antenna's operation.

The court finds that Claim 5 of the Blonder-Tongue patent was obvious at the time it was made and is therefore invalid. The alleged improvement was taught by the following references in the prior art:

1. Technical Report No. 52, published October 1, 1961, entitled "Analysis and Design of the Log-Periodic Antenna," by Robert L. Carrel;

2. the Mayes and Heslin antennas;

3. the prior art patents cited by the Patent Examiner during prosecution of the application for the Blonder-Tongue patent and the Kane, Wickersham et al., Valach, Gross, Winegard, and Callaghan patents.

CLAIMS FOR ATTORNEYS' FEES.

The plaintiff and the counterclaim defendant have each moved for an award of attorneys' fees in their favor, based upon their claims that the counterclaim was interposed and prosecuted against them in bad faith. The Foundation's claim is based upon 35 U. S. C. § 285, which reads:

> The court in exceptional cases may award reasonable attorney fees to the prevailing party.

JFD's claim is based upon "principles of equity and good practice."

Both claims will be denied. The statutory provision, as well as equity, permits such an award only where extraordinary circumstances exist and it is clear to the court that a gross injustice will be done unless such an award is made. *Siebring* v. *Hansen,* 346 F. 2d 474 (8th Cir. 1965), *cert. denied,* 382 U. S. 943. I do not find that Blonder-Tongue's counterclaim was so vexatious and so unjustified as to make it an "exceptional case" within the ambit to the statute or within the dictates of equity. *Hyster Co.* v. *Hunt Foods, Inc.,* 263 F. 2d 130, 134 (7th Cir. 1959). Although the court has not held that the counterclaim was legally proved in any respect, Blonder-Tongue was not clearly acting in bad faith in bringing it before this court.

This memorandum of decision will stand as the Court's findings of fact and conclusions of law within the meaning of Rule 52 of the Federal Rules of Civil Procedure.

SUPREME COURT, U. S.

FEB 26 1969

JOHN F. DAVIS, CLERK

IN THE

Supreme Court of the United States

OCTOBER TERM, 1968.

No. 993

UNIVERSITY OF ILLINOIS FOUNDATION,
Petitioner,

vs.

WINEGARD COMPANY,
Respondent.

RESPONDENT'S REPLY TO PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE EIGHTH CIRCUIT AND PETITIONER'S REQUEST FOR DELAYED CONSIDERATION.

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OPPOSITION TO REQUEST FOR DELAYED CONSIDERATION OF PETITION.

Petitioner has requested that consideration of its petition be delayed until the Court of Appeals for the Seventh Circuit has rendered a decision in a case now before it (PB 1, 11).*

The parties and much of the subject matter of the Seventh Circuit case are distinct and not related to the *Winegard* case. The record developed in the case tried in the Seventh Circuit (PB 11), now on appeal to the Court

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* Note: Each reference designated "PB" herein refers to Petitioner's Brief and the page number therein.

of Appeals for the Seventh Circuit (PB 1), of course, is substantially different from the record developed in the *Winegard* litigation. It also should be noted that the Court of Appeals for the Eighth Circuit specifically alluded to Judge Hoffman's decision.[1]

Petitioner, in support of its request for delayed consideration, also notes that "there are several instances of probable infringement in circuits other than the Seventh or Eighth in which validity of the Isbell patent *may be* litigated." This appears as a plea to delay consideration until such time as another Court of Appeals renders a conflicting decision thereby enhancing the probability of securing the attention of this Court. The plea is not responsive to any stated right of Petitioner or of the need for reasonably expeditious resolution of this conflict. We respectfully submit that Respondent should not be subject to an indefinite delay in the final resolution of its case by reason of the incident of other litigation now pending which may or may not state a different conclusion regarding validity of a patent involved in both suits.

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1. "Plaintiff urges that the trial court erred in denying patent validity and calls our attention to a subsequent decision in a federal district court in Illinois which upholds the validity of the same patent against another defendant, *University of Illinois Foundation* v. *Blonder-Tongue Laboratories, Inc.*, N. D. Ill., Civ. No. 66 C 567. However, as recognized by the district court in Illinois, we must determine this case on its own record" (PB 2A).

REPLY TO PETITION FOR WRIT OF CERTIORARI.

We submit that the questions set forth in Petitioner's brief (PB 2-3) avoids expression of the significant issue in this case. Accordingly, we present our statement of the question before this Court.

QUESTION PRESENTED.

Whether the district court and the Court of Appeals for the Eighth Circuit properly applied the nonobvious test of 35 U. S. C. § 103 in determining that the patent in suit did not involve patentable subject matter.

STATEMENT OF CASE.[2]

This action was instituted by Petitioner when it filed a complaint in the United States District Court for the Southern District of Iowa alleging infringement of Letters Patent 3,210,767. Petitioner is the owner by assignment of said patent.

The decision of the District Court is set forth in the appendix attached to the petition (PB 10A-23A). The District Court stated that ". . . it can be seen that an antenna with the general parameters of Isbell patent[3] will result from a combination of the dipole array of Katzin[4] with the transposed feeder line of the Channel Master

2. Petitioner's statement of the case is primarily argumentative and not a concise statement of the facts material to the consideration of the question presented.

3. U. S. Patent 3,210,767.

4. U. S. Patent 2,192,532.

"K. O."[5] or the Koomans[6] or Winegard[7] patents." The District Court concluded that ". . . upon full consideration of the record herein (the Court), finds that the disclosure of Isbell Patent No. 3,210,767 is lacking in the prerequisite nonobviousness and is, therefore, invalid" (PB 22A-23A).

The Court of Appeals for the Eighth Circuit affirmed the decision of the District Court (PB 1A-9A) and stated:

> "We have examined the record and find that all claims (of the Isbell patent) must be denied, lacking nonobviousness as a matter of law for essentially the same reasons set forth by the court below." (PB 2A—parenthetical expression added.)

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5. One of the antennas cited as prior art, produced and marketed by the Channel Master Corporation of Ellenville, N. Y. between September 1954 and December 1958 (PB 16A).

6. U. S. Patent 1,964,189.

7. U. S. Patent 2,700,105.

ARGUMENT.

THE STANDARD TO DETERMINE WHETHER SUBJECT MATTER IS PATENTABLE IS SET FORTH IN 35 U. S. C. SECTIONS 101 AND 103, WITH SECTION 103 REQUIRING NON-OBVIOUS SUBJECT MATTER.

Patents are granted only for developments which are new, useful and non-obvious to one having ordinary skill in the art. The patent laws do not require that there be "invention" but rather that there be statutory unobviousness.

Hard work in studying the discoveries and acquiring the ideas of others, the exercise of good judgment in selecting them and skill in applying them to practical results do not involve the creation of patentable subject matter. All such activity must be measured against the state of the art and, of course, must satisfy the standard of patentability.

The content of the prior art must be determined by the mandates of this Court as set forth in *Graham* v. *John Deere Co.*, 383 U. S. 1, 17 (1966). There is was stated:

> * * * the § 103 condition, which is but one of three conditions, each of which must be satisfied, lends itself to several basic factual inquiries. Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined.* * *

The standard by which the District Court and the Court of Appeals for the Eighth Circuit determined that the Isbell development did not involve patentable subject

matter is the standard expressed by this Court in *Graham, supra.* Both courts examined the prior art to determine the scope and content thereof; both courts evaluated the differences between the Isbell development and the prior art examined and both courts, in light of this examination, determined that the Isbell antenna did not involve nonobvious subject matter.

Petitioner concedes that such an examination and determination was made but contends that both courts erred in the basic determination and failed to properly consider the significance of other secondary aspects (PB 7).

PETITIONER'S CONTENTION THAT THE COURT OF APPEALS APPLIED THE WRONG STANDARD OF PATENTABILITY IS NOT CORRECT.

Petitioner contends that the Court of Appeals applied the wrong standard of patentability (PB 6), further stating that the standard applied was contrary to that expressed by this Court in *Graham* v. *John Deere, supra.* This contention is predicated upon an alleged "unpredictability" with respect to the subject matter of the Isbell patent. We submit that the "unpredictability" attributed to the Isbell development is not supported by the record in the present controversy. In any event, we submit that Petitioner primarily seeks to obscure the real issue, namely, whether the Isbell antenna was obvious within the meaning of 35 U. S. C. 103.

The courts below applied the proper standard of patentability. The Court of Appeals for the Eighth Circuit, for example, in addressing itself to the statutory standard of patentability to be applied, pointed out with particularity that, as Mr. Justice Clark stated in *Graham* v. *John Deere, supra,* the test of nonobviousness is one of inquiry, not quality, and further set forth that such inquiry involves:

> "(1) scope and content of the prior art, (2) differences between the subject patent and the prior art, (3) the level of the skill in the art at the time involved and (4) secondary considerations relating to commercial success, long felt want, et al." (PB 4A.)

Even the most casual comparison confirms that the standard applied by the Court of Appeals is in complete harmony with that set forth in *Graham*.

Petitioner's real objection resides in the fact that the courts below refused to consider the factor of "unpredictability" as the test of patentable subject matter but adhered to the statutory standard expressed in 35 U. S. C. 103. However, it cannot be said that the Court of Appeals did not consider the factor of alleged "unpredictability" in relation to the Isbell subject matter, as Petitioner suggests. The Court was well aware of secondary considerations on the question of patentability and pointed out that "predictability" is not the test of patentability under section 103 and merely obscures the true issue of nonobviousness (PB 4A).

Many "secondary" tests have been referred to over the years. The Court of Appeals specifically referred to "commercial success, long-felt need, et al." (PB 4A). Besides "unpredictability", the "et al." includes such factors as: delay or failure of others to produce the subject matter; improved economy, efficiency or simplicity; tribute of competitor's imitation; extensive royalty agreements by competitors; supplanting of older, prior art structures; elimination of a technological block; prior unsuccessful efforts or experiments; citation of many prior art patents to anticipate disclosed subject matter. The foregoing list is not exhaustive but is intended to be representative of factors frequently considered by the Courts. In each case, the particular factor cannot in and of itself establish patentability where none exists. We consider it equally well

established that such secondary considerations are applicable only where there is serious doubt as to whether certain subject matter is patentable. Accordingly, we submit that if an alleged factor of "unpredictability" is to be considered in a particular case, it necessarily must be of a secondary nature, rather than primary, and cannot, of itself, establish patentability.

Petitioner's Reasons and Arguments.

The Petitioner sets forth two grounds in alleging that the Court of Appeals erred in its decision. It is stated separately that "Unpredictability of Result Cannot Be Ignored in Determining Non-Obviousness" (PB 7) and "One Skilled in the Art Would Have Been Deterred From Making Isbell's Combination." (PB 10.)

It is significant to note that the argument under these headings is the same as that made to the Court of Appeals in the Petition for Rehearing to that Court. There is a slight modification of one (first) paragraph on page 8 of Petitioner's brief, as well as a relocation thereof, and the addition of one (last) paragraph on page 9. Petitioner's brief in support of its request for rehearing is set forth in the appendix attached (2A-5A). The Petition for Rehearing was denied and Petitioner now presents the same arguments to this Court.

The Alleged Factor of Unpredictability.

Petitioner states that "predictability" is a major factor to be considered in resolving the issue of obviousness and includes cases cited in support of this position (PB 7). We are unable to find such support in the cases cited. Petitioner relies upon *Application of Pantzer,* 341 F. 2d 121 (1965), for the proposition that to hold an invention ob-

vious one skilled in the art must anticipate success with "a high degree of probability." (PB 7.) Such language does appear in that case. The language, however, is taken out of context and standing by itself does not express the position of that Court. The three sentences immediately preceding the language cited by Petitioner provide a more definitive perspective with respect to the *Pantzer* decision, namely (126):

> "* * * The Appellant's position appears to be that we must be able to predict with certainty that those glycols will dissolve with methetharimide before rejection is proper here.
>
> However, as we pointed out in *In re Moreton*, 48 CCPA 928, 288 F. 2d 940, *obviousness does not require absolute predictability.* Where, as here, the knowledge of the prior art clearly suggests that the use of glycols as solvents in place of water to form solutions of methetharimide stable against hydrolysis would be successful, *the mere possibility of failure does not render their successful use unobvious.*" (Emphasis added.)

The rule that obviousness does not require absolute predictability is well founded in the law. *In re Moreton* (1961), referred to by the Court in *Pantzer,* has repeatedly been relied upon in subsequent cases before the Court of Customs and Patent Appeals as well as by other Courts.[8] As such, it may be considered a significant decision on this question.

The *Moreton* case closely parallels the case at hand, with the exception that it deals with subject matter which is related to the chemical field rather than the electrical field.

8. See: *Application of Huellmantel,* 324 F. 2d 998 (1963); *Application of Pantzer and Feier, supra; Application of Graf,* 343 F. 2d 774 (1965); *Application of Crounse,* 363 F. 2d 881 (1966); *Application of Wilson,* 368 F. 2d 269 (1966); *Application of Miegel and Verbanc,* ..... F. 2d ....., 159 USPQ 716 (1968); *Clinical Products, Ltd.* v. *Brenner, Comr. of Pats.,* 255 F. Supp. 131 (D. C., DC, 1966); *Clinical Products, Ltd.* v. *Brenner, Comr. of Pats.,* 255 F. Supp. 151 (D. C., DC, 1966).

The application in the *Moreton* case concerned a hydraulic fluid suitable for use, for example, in aircraft systems over a wide temperature range (—80°F. to 400°F.). The Court with respect to the statutory standard of obviousness stated at 288 F. 2d 940, 942:

> "We feel constrained to hold that the prior art possessed quite full knowledge of the use of appellant's orthosilicate component as hydraulic fluid and of its viscosity-temperature behavior. This brings the question of patentability of the claimed invention down to the obviousness of adding * * *"

The applicant (appellant) in *Moreton* sought to avoid the consequences of the prior art by raising the issue of "unpredictability". In this regard, the court pointed out (943):

> "Appellant bases considerable argument on a reference no longer relied upon by the Patent Office * * *. It is said to show that the addition of viscosity improving agents to lubricants does not give predictable results * * *."

With the foregoing as a background, the Court stated (943):

> "What this amounts to is an argument that if one slavishly following the prior art, albeit with a little educated imagination, will sometimes succeed and sometimes fail, then he is always entitled to a patent in case of success. That is not the intention of 35 U. S. C. 103. Obviousness does not require absolute predictability. Where, as here, the knowledge of the art clearly suggests * * *, the mere possibility of failure does not render their successful use 'unobvious'."

It should be observed that in the *Moreton* case, and in the present case, prior art is present that is shown to possess full knowledge of the subject matter in question and in each it is urged that "unpredictability" of results prevent the application thereof to avoid any conclusion of

obviousness. Petitioner here is advocating the very concept denied in *Moreton* and by the Courts below in the present case. Petitioner suggests that notwithstanding the teachings of the prior art, a patent is sustainable for the simple reason that there was a mere possibility of failure in attaining each and every objective. In this sense the term "unpredictability" is not proper. Petitioner appears to be advocating "infallibility" or "prevision" as being necessary before an invention may be found obvious. These factors have been considered by the Courts. In *Naamlooze Venootschafs* v. *Coe, Commissioner of Patents,* 132 F. 2d 573, 575 (C. C. A. DC, 1942), it was stated:

> "It is true that anological reasoning is more restricted in chemistry than in the field of mechanics. (citations omitted). This is because chemistry is essentially an experimental science in which predictions cannot be made with the same certainty that they can be made in mechanics. (citations omitted) * * *. But from the facts that *prevision is not certain* in chemistry, that progress in the chemical art is reached largely through experiment, and that patents are often upheld where the inventor stumbles upon a discovery, * * *, *it does not follow that every new and useful result accomplished by experiment is patentable* (citations omitted)." (Emphasis added.)

An illuminating treatment on the question of absolute predictability (or infallibility) is found in *Hedman* v. *Commissioner of Patents,* 253 F. Supp. 515, 520 (D. C., DC 1966). The Court there stated:

> "* * * While utmost care must be exercised by chemical patent examiners and other ordinarily skilled chemists in making predictions based on the general rules of chemistry, on the ground that even the most reasonable predictions in this science often turn out to be wrong, this factor should not preclude 'a person having ordinary skill in the art' of chemistry from making reasonably based predictions on the basis of prior art knowledge.

> With further regard to this alleged lack of predictability, little sophistication is required to distinguish between the undeniably true statement that there is no absolute predictability in chemistry on the one hand, and the erroneous statement that there is absolutely no predictability in chemistry on the other hand. An unequivocal holding to the effect that there is no predictability whatsoever in the science of chemistry would completely eliminate the obviousness test of 35 U. S. C. § 103 from consideration in determining the patentability of claimed chemical inventions. If there is no predictability in chemistry, then no new chemical invention would ever have been obvious at the time it was made to an ordinarily skilled chemist, and it would logically follow that any new and useful chemical invention would be patentable. Such elimination of the obviousness test of 35 U. S. C. § 103 in determining the patentability of chemical inventions would be quite contrary to statute law and to the clear intent of Congress in enacting Section 103 that the test should be applied in determining patentability of every 'invention,' whether chemical, mechanical, or electrical."

Petitioner nonetheless alleges that predictability is a major factor to consider in determining patentability. However, if there is no predictability concerning frequency independent operation for log-periodic antennas, then no new invention would ever have been obvious at the time it was made to an ordinarily skilled antenna designer and it would logically follow that *any* new and useful antenna structure would be patentable. Surely this cannot be the law for, as *Hedman* states, such a holding would completely emasculate the obviousness test under Section 103.

It might be well to offer a brief general comment with respect to the factor of unpredictability. It will be noted from the cases cited that it is a factor closely related to the chemical field. As pointed out in *Naamlooze Venootschafs, supra,* chemistry is essentially an experimental

science in which predictions may not be made with the same certainty as in mechanics. However, we are not persuaded that electrical or electronic subject matter should be considered as analogous to the chemical area rather than the mechanical area. We submit that any subject matter in the electrical arts is more susceptible to mathematical analysis than in the chemical arts, and perhaps even more than in the mechanical arts. To avoid making an issue of this point, we treat the matter as if predictability were a common factor in considering electrical patents. We submit that the same statutory standard of patentability is to be applied, whether the alleged invention is chemical, electrical or mechanical in nature. *Hedman* v. *Commissioner of Patents, supra.*

Consideration of the question of predictability has not been restricted to the Court of Customs and Patents Appeals and the District Court for the District of Columbia. This Court also has passed on the question. In *Mandel Bros., Inc.* v. *Wallace,* 335 U. S. 293 (1948), this Court was faced with the question of whether it constituted patentable invention to combine urea with a solution of aluminous sulphate in a cosmetic astringent preparation. The Courts below held that the use of urea as an anti-corrosive agent was a matter of public knowledge and that it had previously been used as a corrosion inhibitor in compounds other than antiperspirants. Nevertheless, the Respondent there, as the Petitioner here, argued that the prior art was irrelevant, for the teachings, if any, would not have led a chemist skilled in his art to undertake the experiment which resulted in success. What is particularly significant is that it was earnestly urged that urea combined with acid salts brought about a result contrary to what a skilled chemist would have concluded. Ergo, it was a "paradoxical" result, unpredictable by a skilled chemist. This Court addressed itself to this argument and stated at page 295:

> "But we think that the state of the prior art was plainly sufficient to demonstrate to any skilled chemist searching for an anticorrosive agent that he should make the simple experiment that was made here.* * * As the United States Court of Appeals for the Second Circuit pointed out when this patent was before it '* * * skillful experiments in a laboratory, in cases where the principles of the investigations are well known, and the achievement of the desired end requires routine work rather than imagination, do not involve invention'."

THE ISBELL ANTENNA WAS OBVIOUS TO ONE HAVING ORDINARY SKILL IN THE ART AT THE TIME THE ANTENNA WAS MADE.

It should be noted that various statements set forth in the Petition have no foundation in the record. Petitioner contends, for example, that without the purported method for designing frequency independent log-periodic antennas relied upon by the Court below, there is no basis in the art for combining elements to make Isbell's combination (PB 8). We submit that this is inaccurate as well as an unwarranted play on words. Petitioner states that there is no method of designing "frequency independent log-period antennas" because it cannot be shown that one can predict with absolute and unswerving infallibility beforehand that all such fabricated log-periodic antennas will exhibit the desired frequency independence. However, it cannot be contested, and the Courts below so found, that a method of designing log-periodic antennas did and does exist (R 177), (PB 3A), a method which was well known in the art. Accordingly, there was every basis for combining elements to arrive at Isbell's antenna based on the teachings of the prior art. To arrive at a log-periodic antenna one must employ the design principles set forth in the known theory of log-periodic antenna design (R 177) (PB 3A),

deliberately, or at least unwittingly, but applied nevertheless.

To say, as Petitioner contends, that an antenna designer was faced with the problem of selecting blindly the single effective combination of elements from some vast number of possible, but inoperative, combinations is not true. The very most than can be said of Isbell's development is that simple dipoles were substituted in lieu of folded dipoles incorporated in a prior art structure (the Channel Master K. O. antenna, for example. R 197) which embodied the log-periodic design principles (PB 6A, 8A, R 35). The record is clear that simple and folded dipoles are electrically equivalent and have been utilized interchangeably by antenna engineers (*SR 49-51) (SR 131-142) (PB 6A). This hardly is selecting "blindly" from a "vast" number of possible combinations. Nor is this the only means of arriving at Isbell's combination. The trial court specifically pointed out that the Isbell patent will result from a combination of a prior art dipole array (Katzin Patent) and the transposed feeder line (Channel Master K. O. antenna *or* Winegard Patent *or* Koomans Patent) when the lengths and spacings are adjusted by the known log-periodic theory of antenna design (DuHamel & Ore article, R 177) (PB 20A, 21A). This is hardly "selecting blindly" elements and their arrangement in an antenna structure. Even the excerpt from an antenna engineering handbook (R 191) referred to by Petitioner in its brief before the Court of Appeals in support of the position that the design of frequency independent types of log-periodic antennas generally cannot be considered entirely predictable, points out how simply and easily the Isbell structure is derived from the prior art DuHamel structure. We are referring to the excerpt from Jasik's Antenna Engineering Handbook (DX-A-10b, R 191). It is there shown that to obtain the Isbell dipole array, one need only collapse all the angles in the

* SR—Supplemental Record.

DuHamel structure to zero, nothing more (R 191). Again, this is hardly selecting elements or structure arrangement "blindly", without purpose. The record clearly shows that the prior art suggests Isbell's combination. The only thing surprising would be if the combination failed to exhibit the expected result.

Petitioner represents to this Court that others at the University of Illinois

> "* * * tried and failed to achieve the Isbell type of antenna * * *" (PB 9).

Petitioner then refers to pages 103 and 104 of the Record in support of the statement. Pages 103 and 104 of the Record are set forth in the appendix hereto (7A-9A). There is no statement which even suggests the conclusion stated by Petitioner that others tried and failed to achieve the Isbell type of antenna. The representation is totally without support and is an improper conclusion which, we submit, represents nothing more than the ardent wish of Petitioner that the evidence and testimony were thus.

A point that should not be overlooked is that at least one other developed the subject matter disclosed in the Isbell patent at almost the same time as Isbell. The Isbell patent application was involved in an interference with an application filed in behalf of Alec Kravis and Mathew Fredrick Radford, Interference No. 92,150 (SR 113). While Isbell was ultimately successful on the question of priority, one cannot and should not ignore the fact, nor the implications with respect thereto, that others had in fact developed the same subject matter independently at substantially the same time. The case for patent validity is substantially weakened by this circumstance alone since it suggests that the means necessary to solve the particular problem is already in the public domain. *Audio Devices, Inc.* v. *Armour Research Foundation,* 293 F. 2d 102 (2 Cir., 1961);

Graham v. *Jeoffrey Manufacturing Inc.*, 206 F. 2d 769 (5 Cir., 1953).

With the foregoing in mind with respect to the record in the present case, we are unable to understand Petitioner's assertion that one ordinarily skilled in the art would have been deterred from making Isbell's combination. On the contrary, the reverse is true, and the Courts below could do little else but hold as they did. As stated by the trial court:

> "It is thus apparent that the Isbell antenna is a combination of elements, all known in the prior art and also that these known elements were combined in the Isbell antenna in a manner dictated by a theory also known in the prior art." (PB 21A.)

Contrary to Petitioner's assertion (PB 5), the "theory" referred to by the court is identified as "the log-periodic theory of antenna design."

THE COURT OF APPEALS WAS CORRECT IN DISTINGUISHING THE ADAMS CASE.

One last point we feel should be commented upon with respect to Petitioner's reasons for granting the Writ of Certiorari is the reference to the case of *U. S.* v. *Adams*, 383 U. S. 1. Petitioner suggests that the Court of Appeals erroneously distinguished the *Adams* case (PB 10). Also, it is suggested that the Court of Appeals must have concluded that there was no deterrent which faced those in the art who sought to achieve Isbell's result (PB 10). Reference to the Court of Appeals' decision will show that the Court stated that "there was not involved the same deterrent" in the present case as in *Adams* (PB 6A). It will be noted that Petitioner has changed "the same deterrent" to *no* deterrent. Be that as it may, one needs but a cursory examination of the *Adams* case to confirm that the Court of Appeals is correct in that the same deterrent is not present here.

The patent in suit in the *Adams* case disclosed a non-rechargeable, water-activated battery having magnesium and cupurous chloride as the respective electrodes. As such, it more properly pertains to subject matter in the chemical art than in the electrical art, notwithstanding the device is a battery. This Court observed that it was the *first* practical, water-activated, constant potential battery. It exhibited operating characteristics which were entirely *unexpected* and surpassed *all* then-existing wet batteries. It is to the state of the prior art, however, which helps spotlight the non-obviousness of the Adams battery. The Court pointed out that despite a century and a half of advancement with respect to batteries prior to the Adams patent applications, the Patent Office could not find *one* reference to cite against the invention. In addition, experts had expressed disbelief in the invention. Prior art batteries from which the Adams battery was claimed to have been copied were long before discarded. Furthermore, one particular prior art reference (foreign patent) relied upon not only disclosed inoperative subject matter, but was in fact highly dangerous. An attempt to construct a battery according to its teachings first produced a fire, then an explosion when the battery was being assembled.

The Adams patent involved the interchanging of chemicals, which were non-equivalents, notwithstanding the teachings, or more correctly the absence of teaching, of the prior art to achieve the surprising "water battery," while Isbell merely incorporated (or substituted) known elements operating within known principles to achieve a desired result, which result, we might add, was to be expected. Frequency independent log-periodic antennas were shown to be well established in the prior art. Isbell was hardly faced with the same deterrent as Adams, as the Court of Appeals pointed out (PB 7A). To reach the same conclusion with respect to the Isbell combination as Petitioner advocates,

one would necessarily be required to start with a clean sheet and disregard entirely the prior art. However, this type of posture was specifically criticized by this Court in *Mandel* v. *Wallace, supra.*

CONFLICT IN DECISIONS BETWEEN COURT OF APPEALS AND DISTRICT COURT SHOULD NOT BE SUFFICIENT GROUNDS FOR GRANTING CERTIORARI.

Petitioner notes that there is a conflict between the Court of Appeals decision in the present case and a decision by the District Court for the Northern District of Illinois with respect to the validity of the Isbell patent. While not stated in precise words, we infer that Petitioner contends that this is sufficient grounds for this Court to grant the requested writ of certiorari. We respectfully submit that to do so for this reason would clearly be contrary to the established precedent.

Moreover, as previously pointed out, there are significant differences in the record before this Court and the record on which the decision of the trial court in the Seventh Circuit is based. The Court of Appeals for the Eighth Circuit was quite aware of this District Court decision by Judge Hoffman but noted that its decision must be, as it was, decided on the record before it.

Reasons for granting a writ of certiorari are specifically enumerated in Rule 19(1)(b) of this Court. It is of course to be understood that the reasons as therein stated are neither controlling nor fully measure the Court's discretion in this regard. Among those reasons that are set forth for granting review by certiorari is the case where a Court of Appeals has rendered a decision in conflict with the decision of another Court of Appeals on the same matter. We note that no such reason is stated for granting the writ on the basis of a conflict of decision between a Court of Appeals

on the one hand and a trial court decision on the other. Nor can we find any instance in which a writ of certiorari was in fact granted by this Court on the latter basis.

With respect to certiorari in patent infringement cases specifically, perhaps the language found in American Jurisprudence states it best. We find in 32 Am. Jur. 2d at 699:

> "Certiorari in patent infringement cases will be granted where validity and infringement are in doubt and further litigation resulting in conflict of decision among circuits is improbable because the petitioner is the only competitor in the business, but where there is no conflict between decisions of Courts of Appeal on the question whether a patent is invalid for anticipation or lack of invention, the writ will not be granted."
>
> (Citing: *General Talking Pictures Corp.* v. *Western Electric Co.*, 304 U. S. 175; *Keller* v. *Adams-Campbell Co.*, 264 U. S. 314.)

With reference to the foregoing passage we note that we do not have a case where the Petitioner is the only competitor in the business. Nor do we have a case where further litigation resulting in conflict of decision among circuits is improbable. Petitioner itself states that there are instances of alleged infringement in circuits other than the Seventh or Eighth in which the validity of the Isbell patent may be litigated. There is, of course, no conflict of decisions between Courts of Appeal. Accordingly, we submit there exists no proper foundation for this Court to grant a review by certiorari in the present case.

THE STANDARD OF PATENTABILITY APPLIED BY THE COURT OF APPEALS FOR THE EIGHTH CIRCUIT WAS PROPER.

Petitioner argues that the decision of the Court of Appeals in this case

> "... effectively denies the patentability of all combinations of known elements." (PB 12.)

The Court doubtless will be surprised to learn that they have "effectively" passed new legislation affecting patents. We have assumed the decision of the Court did not extend beyond a determination that the Isbell antenna did not involve nonobvious subject matter. There is no statement in the decision of the Court of Appeals which will support the argumentative conclusion stated by Petitioner.

Petitioner proceeds to note that:

> "The standard of obviousness cannot be as broad as that adopted by the Court of Appeals. * * * If the mere fact that known elements are intentionally combined renders a combination unpatentable, even though the result is unpredictable and the combination is made without a reasonable prospect for success, then only accidental discoveries will be patentable, * * *." (PB 12-13.)

A standard of patentability expressed in the terms of Petitioner's argument would necessarily contemplate the existence of patentable subject matter if:

(1) the result is unpredictable;
(2) the development is made without a reasonable prospect for success.

Even though this is a new proposal for a standard of patentability we can explore the result of application of the standard. Since the Court of Appeals, in quoting from the Jasik handbook, observed that "it is not possible to determine *a priori* the frequency independent type of log-periodic antennas" then all one need do to develop an antenna for which a patent must issue would be to experiment with any design not previously developed in that *exact* form. If it worked a patent would issue—the antenna need only be (1) new and (2) useful. Inquiry into the scope and content of the prior art would not be permitted with this standard of patentability.

CONCLUSION.

We respectfully submit that Petitioner has not shown sufficient cause for granting the petition for a writ of certiorari.

Respectfully submitted,

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APPENDIX.

IN THE UNITED STATES COURT OF APPEALS

For the Eighth Circuit

No. 19000 Civil

UNIVERSITY OF ILLINOIS FOUNDATION,

Appellant,

vs.

WINEGARD COMPANY,

Appellee.

APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE SOUTHERN DISTRICT OF IOWA, DAVENPORT DIVISION.

APPELLANT'S PETITION FOR REHEARING IN BANC.

INTRODUCTION.

Now comes University of Illinois Foundation, plaintiff-appellant, and respectfully petitions for rehearing in banc af the Court's decision of September 30, 1968, which affirmed the District Court's ruling that the invention covered by the Isbell patent in suit was obvious in view of the prior art and that the patent is therefore invalid.

This petition is based on the following points:

1. The standard of obviousness applied by the Court is improper and will result in the complete destruction of our entire patent system. If the mere fact that known elements are intentionally combined renders the combination unpatentable, even though the result is unpredictable and the combination is made without a reasonable prospect for success, then only accidental discoveries will be patentable, because there are no new elemnts which can be combined.

2. The Court's allegation that appellant did not claim the patented invention to "embrace elements having an interdependent functional relationship" is erroneous. The decision of the Supreme Court in *United States* v. *Adams,* 383 U. S. 39 (1966), is fully applicable to this case.

Argument.

I. The court applied the wrong standard to the issue of obviousness.

The log-periodic dipole antenna array covered by the Isbell patent in suit is admittedly a combination of old elements. In its decision, the Court conceded the following:

1. There was no reference teaching the design of log-periodic antennas.

2. The individual elements of the Isbell antenna array could be connected in countless combinations and variations involving the selection of these elements, the manner in which these elements are combined, and the size and spacing of these elements.

3. No one could predict which, if any, of these countless combinations would give the results obtained by Isbell.

Unpredictability of Result Cannot Be Ignored in Determining Nonobviousness.

The Court dismisses the unpredictability of Isbell's invention as merely tending "to obscure the true issue of 'nonobviousness'." Granting that the statutory standard is "nonobviousness," appellant nevertheless submits that predictability is a major factor to be considered in resolving the issue. As the C. C. P. A. said in *Application of Pantzer*, 341 F. 2d 121, 126 (1965):

> "In other words, an invention can be said to be obvious if one ordinarily skilled in the art would consider that it was logical to anticipate with a high degree of probability that a trial of it would be successful."

In this case, not only was there no "high degree of probability" of success, exactly the opposite was true. One skilled in the art who might have contemplated making Isbell's combination would have anticipated failure with a high degree of probability.

The "obvious-to-try" test applied by this Court is not sufficiently discriminatory. This is a most unrealistic approach to the results of research, which is contrary to statute (35 U. S. C. 103), which provides that "Patentability shall not be negatived by the manner in which the invention is made.", and one which has been criticized by the courts. In *Application of Tomlinson*, 363 F. 2d 928, 931 (1966), the C. C. P. A. repected the argument that the invention involved only "routine experimentation", saying:

> "Our reply to this view is simply that it begs the question, which is obviousness under section 103 of *compositions* and *methods*, not of the direction to be taken in making *efforts* or *attempts*. Slight reflection suggests, we think, that there is usually an element of 'obviousness to try' in any research endeavor, that it

> is not undertaken with complete blindness but rather with some semblance of a chance of success, and that patentability determiations based on that as the test would not only be contrary to statute but result in a marked deterioration of the entire patent system as an incentive to invest in those efforts and attempts which go by the name of 'research'." (Emphasis in original.)

In the present case, there was no indication that Isbell's combination of elements was any more worthy of research than any other of the countless combinations which could have been made. Further, not only does the record show that others at the University of Illinois tried and failed to achieve the Isbell type of antenna (R. 103, 104), it also shows that there was a serious need for such an antenna which others had failed to satisfy (R. 123-125). The fact that this need existed and that others had not even pursued the idea of a log-periodic dipole array, is an additional indication that such a pursuit was not obvious.

Without the so-called "log-periodic theory of antenna design", which this Court found the lower court erroneously assumed to exist, an antenna designer, at the time the invention of Isbell was made, would have been faced with the problem of selecting blindly or by trial and error, the single effective combination of elements made by Isbell from the vast number of such combinations which could be made and which would not work. Further, the log-periodic theory is by no means the only approach to antenna design. There were many other basic approaches from which the designer had to make a selection. The Court of Appeals for the Second Circuit held in *Frank W. Egan & Co.* v. *Modern Plastic Machinery Corp.*, 387 F. 2d 319, 323 (1967):

> "As Judge Learned Hand phrased it in *B. G. Corp.* v. *Walter Kiddie & Co.*, 79 F. 2d 20, 26 USPQ (2 Cir. 1935): 'All machines are made up of the same elements * * * But the elements are capable of an infinity of permutations, and the selection of that group which proves

serviceable to a given need may require a high degree of originality. It is that act of selection which is the invention' . . ."

One Skilled in the Art Would Have Been Deterred From Making Isbell's Combination.

In its decision, this Court distinguished the decision of the Supreme Court in *United States* v. *Adams,* 383 U. S. 39 (1966), on the ground that there was no deterrent which faced those in the art who sought to achieve Isbell's result. It is respectfully submitted that the Court erred.

Rather than having a reasonable prospect for success in designing a log-periodic antenna, one skilled in the art would have expected failure and thus would have been deterred from even making the attempt. The knowledge that only a few successful log-periodic antennas were found among the many log-periodic structures which had been designed and tested is, in effect, a teaching away from such structures for one seeking to design a frequency independent antenna. What is obvious to one skilled in the art depends, of course, on the knowledge possessed by those skilled in the art at the time the invention is made. This knowledge would hardly suggest that a log-periodic structure employing simple dipoles would obviously function in a frequency independent manner.

II. THE ISBELL INVENTION INVOLVES ELEMENTS HAVING AN INTERDEPENDENT FUNCTIONAL RELATIONSHIP.

The Court erred when it stated in its opinion that no claim was made that Isbell's combination involved an "interdependent functional relationship" ofelements. Such a claim was made on pages 17 and 20 of appellant's Brief and on pages 6 and 7 of appellant's Reply Brief. Moreover, the decision of the Court, page 7, footnote 5, shows, in the words

of defendant's president, the interaction which always exists when several elements of an antenna are placed together.

CONCLUSION.

It is submitted that the present case presents an exact parallel with the facts which faced the Supreme Court in the *Adams* case. Here, as in *Adams,* a combination of elements was made, in spite of the knowledge and predictions of the prior art that indicated failure, to achieve an unpredictable result involving the interdependent functional relationship of the several elements. The decision of the Supreme Court in the *Adams case* is therefore fully applicable in the instant situation.

For the foregoing reasons appellee requests an opportunity for a rehearing on these points. Because of the fundamental nature of the question presented, it is requested that the rehearing be before the entire Court, sitting in banc.

Respectfully submitted,

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EXCERPTS FROM RECORD.

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slot antenna you also have some information about the sheet metal antenna.

Q. I believe you testified that the inventor of this antenna which you have just described was Prof. DuHamel, who was at the University at that time?

A. Yes.

Q. And what year was that?

A. Approximately 1957.

(Tr. 163) Q. Incidentally, who assigned the name log-periodic to antennas of this type?

A. Prof. DuHamel.

Q. Can you describe briefly any subsequent log-periodic antennas that came after this, the one you have just described?

A. Yes, the next most significant development in the log-periodic antenna field was the achievement of a unidirectional rediation pattern, whereby the radiation on one side of the antenna was suppressed and the directional beam was produced on the other side of the antenna. This performance was achieved by Dwight Isbell in his work at the University of Illinois Antenna Laboratory and he achieved this type of performance by spoiling the symmetry of the original log-periodic antenna. This was obtained by bending the elements out of the plane in a manner which reduced the radiation in one direction to negligible values.

Q. Did the effort to develop log-periodic antennas continue unabated at least until 1960?

A. Yes.

Q. How many successful log-periodic antennas were developed during that period?

A. Three or four.

Q. How many attempts were made to develop log-periodic antennas?

A. Many.

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(Tr. 164) Q. Could you give us an estimate of what you mean by many?

A. I would say many models were constructed using the concept of the repeating cells. However, only a few of these gave the desired frequency independence performance. As far as an exact number of many, I would say they would run in the 10s.

Q. 20, for example?

A. 20, 30.

Q. What was the difficulty in designing operable log-periodic antennas?

A. There are two principal difficulties. One of these has been referred to as the end effect. Once again, Your Honor, I think the blackboard would be of use in describing what we mean by end effect. Suppose I refer to this particular structure which is, as we have said, a successful frequency independent variety of log-periodic structure, and let's consider it, for reasons of simplicity in the discussion, as a transmitting antenna, although we have heard Mr. Harris testify as an expert that the important electrical properties of an antenna are not really dependent upon whether the antenna is being used as a transmitting

antenna or as a receiving antenna. In other words, the directional characteristic is evidenced in the radiation pattern, the input impedance of the structure, the polarization, or field which is produced, and (Tr. 165) these properties are all the same for a transmitting antenna or a receiving antenna. However, it is easier to understand the operation of transmitting antennas in general than it is to understand the operation of receiving antennas.

Considering this, therefore, as a transmitting antenna, we would have a source of radio frequency energy, shown schematically here by a circle with a half sine wave described therein. This source of radio frequency energy of a particular frequency within the operating band of the